11-6130-392-34

TM 11-6130-392-34

TECHNICAL MANUAL

DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL

CHARGER, BATTERY PP-7286/U
(NSN 6130-01-041-3490)

This copy is a reprint which includes current pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1979

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WARNING

HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions. The power cable, interlock switch, POWER switch, EMI filters, filter capacitor, and the power transformer with their associated wiring are components in the battery charger which may have high voltage on exposed terminals. Before working inside the equipment, set the POWER switch to OFF and remove the power cable from the power source. Ground high voltage points before touching them.

WARNING

High voltage is present when interlock switch (S6) is overridden.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

TM 11-6130-392-34
C1

Change
No. 1

Headquarters
Department of the Army
Washington, DC, 6 January 1983

DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL
CHARGER, BATTERY PP-7286/U
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5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL
2. IF POSSIBLE , TURN OFF THE ELECTRICAL POWER
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL
4. SEND FOR HELP AS SOON AS POSSIBLE
5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

TECHNICAL MANUAL
No. 11-6130-392-34

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC *30 October 1979*

DIRECT AND GENERAL SUPPORT MAINTENANCE MANUAL
CHARGER, BATTERY PP-7286/U
(NSN 6130-01-041-3490)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. A reply will be furnished to you.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual contains description and data, and explanation of circuit functions, direct support (DS) maintenance instructions, and general support (GS) maintenance instructions for Battery Charger, PP-7286/U, hereafter referred to as the battery charger. These maintenance instructions consist of bench tests, troubleshooting procedures, component removal and installation procedures, and adjustment instructions. Tools, materials, and test equipment required for DS and GS use are listed .

Also included in this manual are maintenance instructions for Battery Charging Tray Assembly MX-10154/U. These maintenance instructions consist of component removal and installation procedures. The component parts and special tools required will be found in the Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List for Battery Charging Tray Assembly MX-10154/U.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73/AFR 400-54/MCO 4430.3E.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

1-4. Destruction of Army Materiel

Destruction of Army materiel to prevent enemy use shall be as prescribed in TM 750-244-2.

1-5. Administrative Storage

For procedures, forms, and records, and inspections required during administrative storage of this equipment, refer to TM 740-90-1.

1-6. Calibration

Pertinent publications on calibration of this equipment shall be referenced.

1-7. Reporting Equipment Improvement Recommendations (EIR)

If your Battery Charger PP-7286/U needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, NJ 07703. We'll send you a reply.

Section II. DESCRIPTION AND DATA

1-8. Technical Data

Refer to TM 11-6130-392-12, chapter 1, section II, operator and organizational maintenance manual, for description and data of the battery charger.

CHAPTER 2

FUNCTIONING OF THE EQUIPMENT

2-1. GENERAL

The Battery Charger PP-7286/U is a portable, self-contained unit with attached power cable. The equipment functions as a convenient means for charging various types and sizes of sealed nickel-cadmium batteries, using convenient ac input power sources. Five batteries, all similar or assorted types, may be charged at the same time using the controlled dc output provided by the battery charger. The Battery Charging Tray Assembly MX-10154/U is a portable self-contained unit with attached power cable. It is used in conjunction with Battery Charger PP-7286/U and furnishes a means of charging one through six sealed nickel-cadmium batteries, BB-503/TAS, from a constant current source supplied by the battery charger. Refer to TM 11-6130-392-12, chapter 2, operator and organizational maintenance manual, for controls, indicators, and operating instructions for the battery charger and the battery charging tray assembly.

2-2. Block Diagram Analysis of the Battery Charger

An overall block diagram (fig. 2-1) shows the operating relationship of the battery charger components, and groups the components within major circuit-and-control functions.

2-3. Principle of Operation

When START TIME switch (S2, in Timing Circuit block) is pressed, the battery charger supplies a preset charging current to the batteries connected to J1 through J10. The battery charger will automatically shut off at the end of preset charging cycle. The charging current value and charging time are determined by control settings made by the operator of the equipment.

2-4. Circuit and Control Functions

Circuit and Control functional descriptions, referenced to components shown within a functional block (fig. 2-1), follow for Battery Charger PP-7286/U.

a. Prime power supply and controls. Prime power enters through a power cable. EMI filters (FLI & FL2), on each side of the source power line, prevent radio frequency interference with battery charger operation. The filters are followed by an interlock (S6) which interrupts prime power for safety, when the cover is removed from battery charger. Prime power is controlled by combined circuit breaker/power switch (CBI) and interlock switch (S6), providing manual on-off and automatic trip-off protection if input current exceeds 10 amperes. Dc power for all functions, 10 and 62 vdc nominal, is provided by components of the power supply and input voltage select group which include:

(1) Transformer (T1) capacitor (C1) and diode bridge (A14-CR1) provides 62 vdc to the five charging circuits.

(2) Power supply assembly (A11), provides regulated 10 vdc to the timing circuit.

(3) Input voltage, 115 or 230 vac, is manually selected by switch (S1) and power-on status indicated by lamp (DS1).

b. Timing circuit and controls. The timing circuit controls charging time. Timing circuit assembly (A12) computes and displays remaining time the battery charger will operate, without being reset, before automatic shut-off. Display circuit (A13) counts down and shows remaining time-to-operate. Thumbwheel switch (S3) is used to set charging time. Pushbutton switch (S2) is used to start timing circuit operation. If prime power is interrupted the timing circuit power is taken from a 9 volt battery (B1) inside battery charger. Battery powered logic holds the count, timing circuit restarts and charging continues when prime power returns.

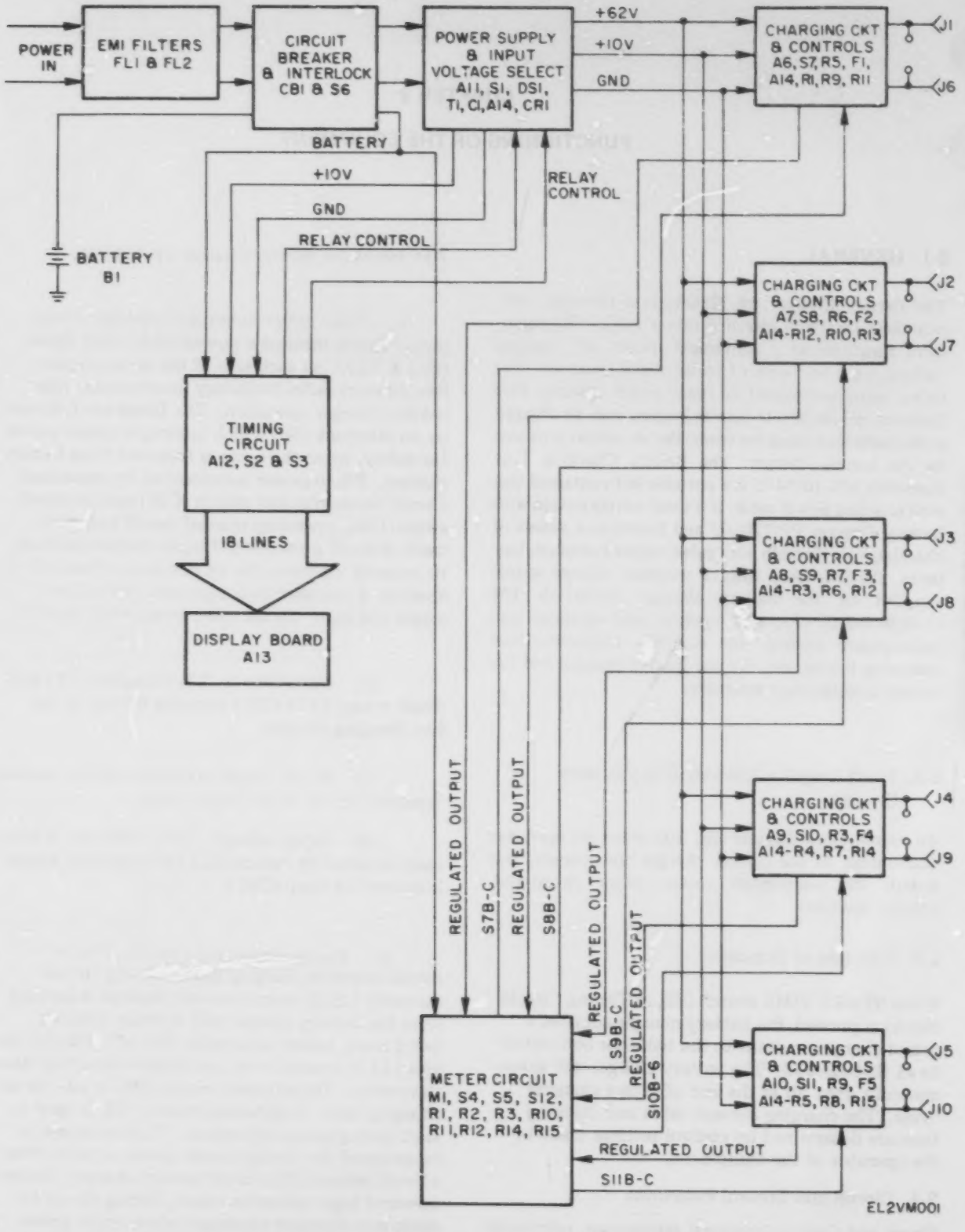


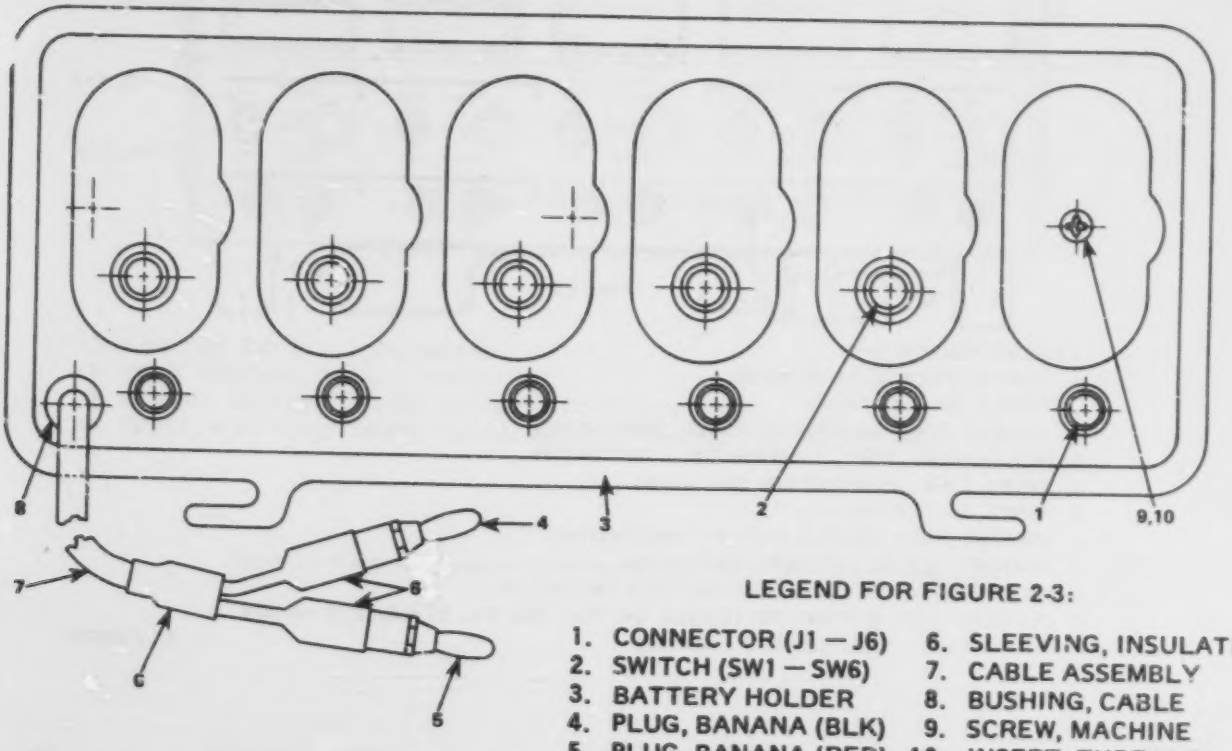
Figure 2-1. Functional Block Diagram, Battery Charger PP-7286/U

c. Meter circuit and controls. Panel meter (M1) monitors current from a selected charging circuit, voltage across any connected battery under charge, or status of internal 9 volt battery (B1). The meter and associated resistors provide convenient current and voltage indications on the one meter. Rotary switch (S12) selects voltage test of internal 9 volt battery (B1), batteries in holders, or remote connected batteries. Rotary switch (S4) selects charging channel to be monitored. Push-button switch (S5) displays voltage measurement on panel meter when pressed or current measurement on panel meter when released.

d. Charging circuit and control. Five identical circuits, each capable of charging one battery, select and supply charging current. Each circuit is fused (F1, as an example) and protected against battery polarity reversal. Charging module (A6, as an example) applies charging current to a connected battery. Three-position toggle switch (S7) selects load resistance across output terminals. Variable resistor (R5) is a fine adjustment control that determines output voltage. Charging current, supplied to a connected battery, is determined by manual settings of the two controls (R5 and S7) and associated resistor assembly (A14).

2-5. Functional Component Locations

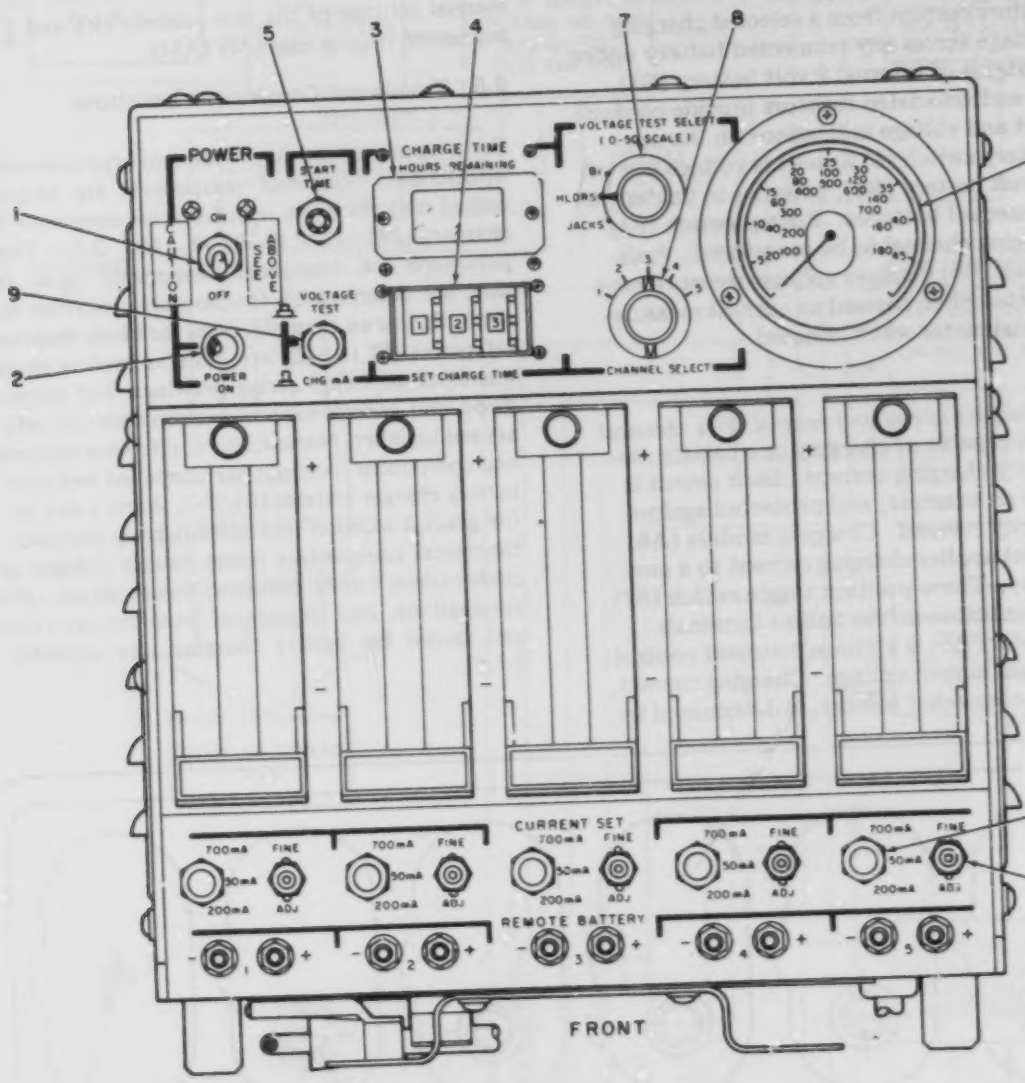
For purposes of operator/crew and organizational level instructions, functional components are located and named only for those seen from the outside of battery charger (TM 11-6130-392-12, fig. 2-1). Then, in paragraph 2-4, functional components, inside or outside, are described by function and reference number (FL1, FL2 as an example) from the block diagram. The references (FL1, FL2) are same as used in equipment manufacturers engineering drawings. For purposes of direct and general support maintenance, all references are put together. Nomenclature, reference designations, and component locations are combined and shown for battery charger exterior (fig. 2-2, sheets 1 and 2). Also, for general location and identification purposes only, functional components inside battery charger are included (sheet 3 of 3). Similary, nomenclature, reference designations, and component locations are combined and shown for battery charging tray assembly (fig. 2-1.1).



LEGEND FOR FIGURE 2-3:

1. CONNECTOR (J1 — J6)
2. SWITCH (SW1 — SW6)
3. BATTERY HOLDER
4. PLUG, BANANA (BLK)
5. PLUG, BANANA (RED)
6. SLEEVING, INSULATION
7. CABLE ASSEMBLY
8. BUSHING, CABLE
9. SCREW, MACHINE
10. INSERT, THREADED

Figure 2-1.1. Functional Component Locations, Battery Charging Tray Assembly MX-10154/U.



LEGEND FOR FIG. 2-2:

1. POWER, TOGGLE SWITCH (CB1)
2. POWER ON, LAMP (DS1)
3. CHARGE TIME HOURS REMAINING, DISPLAY (A13)
4. SET CHARGE TIME, THUMBWHEEL SWITCH (S3)
5. START TIME, PUSHBUTTON SWITCH (S2)
6. PANEL METER (M1)
7. VOLTAGE TEST SELECT, ROTARY SWITCH (S12)
8. CHANNEL SELECT, ROTARY SWITCH (S4)
9. VOLTAGE TEST-CHG mA, PUSHBUTTON SWITCH (S5)
10. CURRENT SET, 3-POSITION TOGGLE SWITCH 700 mA, 50 mA, 200 mA (S7)
11. FINE ADJUST, VARIABLE RESISTOR (R5)

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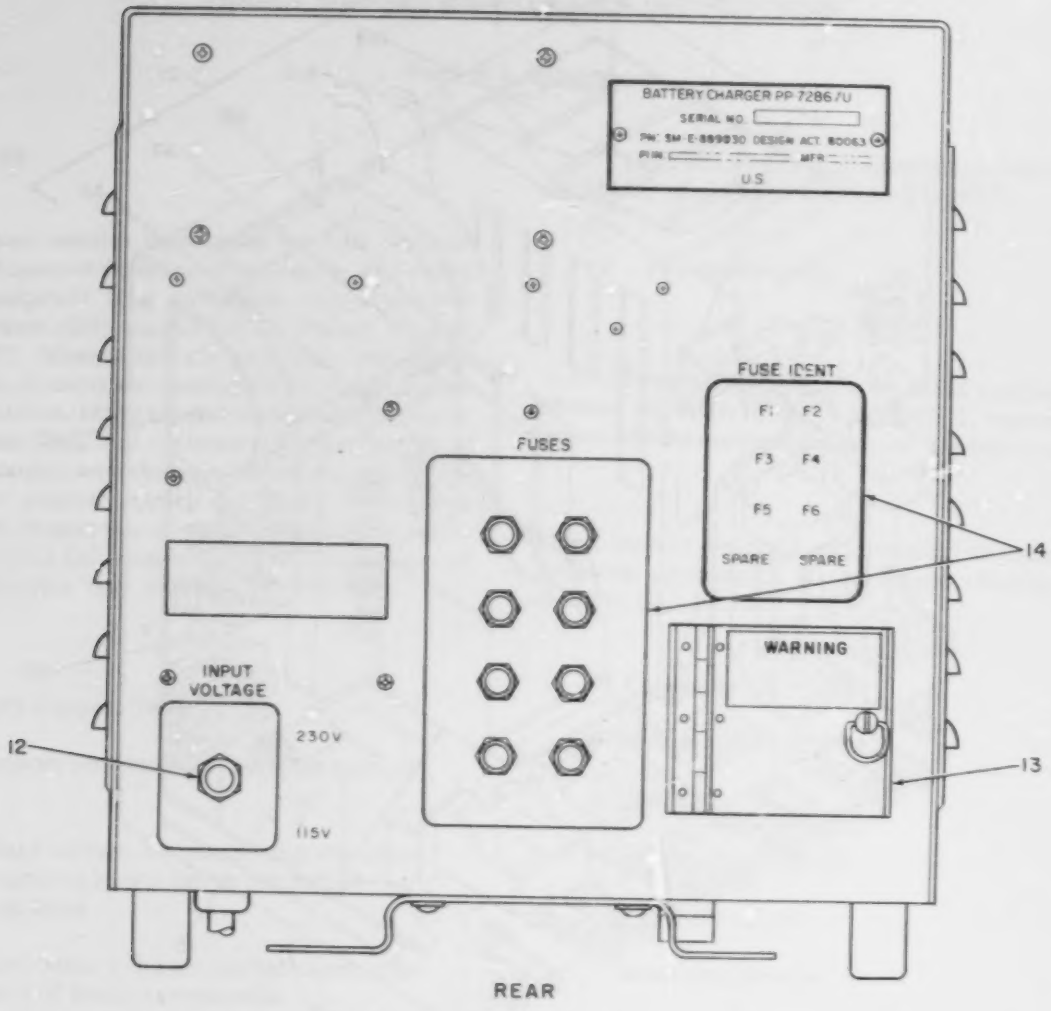
Figure 2-2. Functional Component Locations, Battery Charger, PP-7286/U (Sheet 1 of 3)



LEGEND FOR FIG. 2-2: (CONTINUED)
12. INPUT VOLTAGE, TOGGLE SWITCH (S1)
13. MEMORY BATTERY, INSIDE BATTERY ACCESS DOOR (B1)
14. FUSES, WITH FUSE IDENTIFICATION DECAL (F1 THROUGH F6, AND SPARES)

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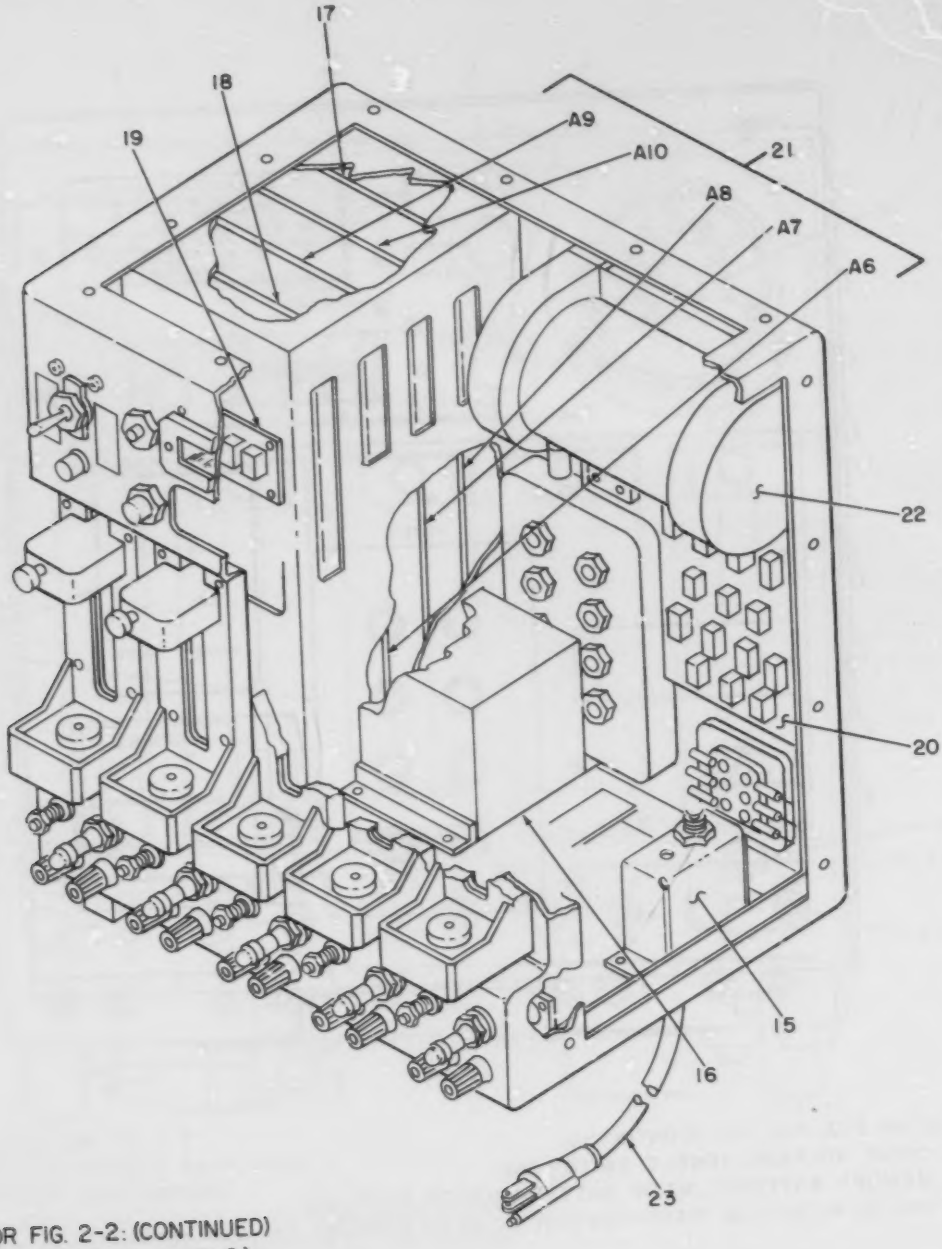
Figure 2-2. Functional Component Locations, Battery Charger, PP-7286/U (Sheet 2 of 3)



LEGEND FOR FIG. 2-2: (CONTINUED)

15. EMI FILTERS (FL1, FL2)
16. TRANSFORMER (T1)
17. POWER SUPPLY ASSEMBLY (A11)
18. TIMING CIRCUIT ASSEMBLY (A12)
19. DISPLAY CIRCUIT ASSEMBLY (A13)
20. RESISTOR ASSEMBLY (A14)
21. CHARGING MODULES (A-6 THROUGH A10)
22. FILTER CAPACITOR (C1)
23. POWER CABLE (W1)

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Figure 2-2. Functional Component Locations, Battery Charger, PP-7286/U (Sheet 3 of 3)

CHAPTER 3

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. General

3-1. Scope

This chapter contains instructions for fault isolation testing, component replacement procedures, and testing of the equipment after component replacement for direct support (DS) maintenance of Battery Charger PP-7286/U. Illustrations are provided, and tools, equipment, or materials are specified for batter charger DS maintenance. Direct support maintenance personnel will perform tests and replacements only. Repair of replaced (faulty) components is limited and will be performed at general support and depot maintenance levels. This chapter also contains instructions for component removal and replacement for DS maintenance of Battery Charging Tray Assembly MX-10154/U.

3-2. Direct Support Tests

Direct support personnel will perform tests, as follows:

a. Make voltage, resistance, and waveform measurements to isolate faulty printed wiring/board assemblies.

b. Test battery charger performance, after replacement of faulty components.

3-3. Direct Support Replacements

Direct support personnel are authorized to replace the following components of the battery charger (fig. 2-2):

a. Printed wiring/board assemblies:

(1) Charging modules (A6, A7, A8, A9, and A10).

(2) Power supply assembly (A11).

(3) Timing circuit assembly (A12).

(4) Display circuit assembly, or individual display modules in the assembly (A13).

b. Power cable (W1).

c. Memory battery (B1), lamp (DS1), and fuses (F1 through F6). Refer to TM 11-6130-392-12, operator and organizational maintenance manual, for instructions.

Direct support personnel are authorized to replace the following components of the battery charging tray assembly (fig. 2-1.1):

a. Connector (J1 — J6).

b. Switch (SW1 — SW5).

c. Cover

d. Banana plug (black).

e. Banana plug (red).

f. Insulation sleeving.

g. Cable assembly.

h. Cable bushing.

i. Machine screw.

j. Threaded insert.

k. Battery holder.

l. Identification plate.

m. Electrical cable.

n. Electrical wire (red, black, white).

3-4. Repainting and Refinishing

Touchup of small damaged areas of the battery charger case and equipment case is authorized at direct support level. Refer to TM 11-6130-392-12, operator and organizational maintenance manual, for instructions.

3-5. Voltage, Resistance, and Waveform Measurements

Fault isolation procedures are specified in paragraph 3-12. Procedures specify when voltage, resistance, or waveform measurements are to be made, and which test points to be used. Illustrations are provided for identity and test point locations.

Section II. TOOLS AND EQUIPMENT

3-6. Test Equipment, Tools, and Materials

a. Test equipment. Test equipment required for direct support maintenance of Battery Charger PP-7286/U is listed in table 3-1.

b. Tools and Materials. Tools and materials required for direct support maintenance, including special tools required for fault isolation, are listed in table 3-2.

Table 3-1. Test Equipment

Item	Technical Manual	Common Name	National Stock No.
Multimeter, AN/USM-223/U (Rs TS-352B/U)	TM 11-6625-654-14	Multimeter	6625-00-999-7465
Oscilloscope AN/USM-281 Stopwatch	TM 11-6625-1703-15	Oscilloscope	6625-00-053-3112
			6645-00-903-1696

Table 3-2. Tools and Materials

Item	Use	National Stock No.
Tool kit, Electronic Equipment, TK-105/G	General Purpose	5180-00-610-8177
Extender board, testing (23 pin) SM-D-889125.....	Special, fault isolation of charging modules (A6 through A10) and power supply assembly (A11).	6130-01-066-4496
Extender board, testing (41 pin) SM-D-889122.....	Special, fault isolation of timing circuit assembly (A12)	6130-01-066-4495

Section III. TROUBLESHOOTING

3-7. Troubleshooting—General

This section contains instructions for troubleshooting Battery Charger PP-7286/U. Direct support personnel will replace faulty components, which are limited to the specific list contained in paragraph 3-3. Replacement procedures are included in section IV. Test procedures for use after replacing a component are included in section V.

3-8. Toubleshooting Test Sequence

a. Visual inspection. Before performing tests, visually inspect the battery charger to find faults. Prevent tests that are not necessary to locate an easily-seen fault.

b. Test sequence. The test sequence for troubleshooting the battery charger and isolating faulty components, is:

(1) Perform troubleshooting test procedures listed in table 3-3.

(2) Perform fault isolation test procedures contained in paragraph 3-12, when required by a table 3-3 instruction.

(3) Test the battery charger, after replacing a faulty component, by using test procedures listed in section V.

c. Test point locations. When test procedures require connection of a test probe to terminals or test points in the battery charger, refer to illustrations referenced and identified, as follows:

A11, power supply assembly (fig. 3-4).
A12, timing circuit assembly (fig. 3-6).
A13, display module U1, U2, U3 sockets (fig. 3-7).
A6-A10, charging modules (fig. 3-8).
TB1, terminal board or C1, capacitor (fig. 3-3).
Battery charger, typical troubleshooting waveform (fig. 3-5).

CAUTION

Do not short adjacent terminals together or to ground when connecting test probe.

3-9. Use of Equipment and Special Tools

a. Equipment.

(1) Oscilloscope AN/USM-281 is recommended. Set controls as indicated in TM 11-6625-1703-15. Use Channel A to observe all waveforms, unless otherwise instructed in text. The circuit test point, sweep time, and vertical sensitivity specifications are included with the waveform.

(2) Multimeter instructions for settings are included in text.

b. Special tools. Extender boards are used to test printed wiring/board assemblies. Remove printed board assembly, to be tested, from the battery charger in accordance with section IV. Push extender board into connector in the battery charger, and plug the printed wiring/board assembly into other end of extender board. Return acceptable printed wiring/board assemblies to same location, or replace in accordance with section IV, if faulty.

3-10. Battery Charger, Preparation for Testing

a. Remove battery charger cover (3, fig. 3-1) from chassis (4) by removing screws and washers (1 and 2).

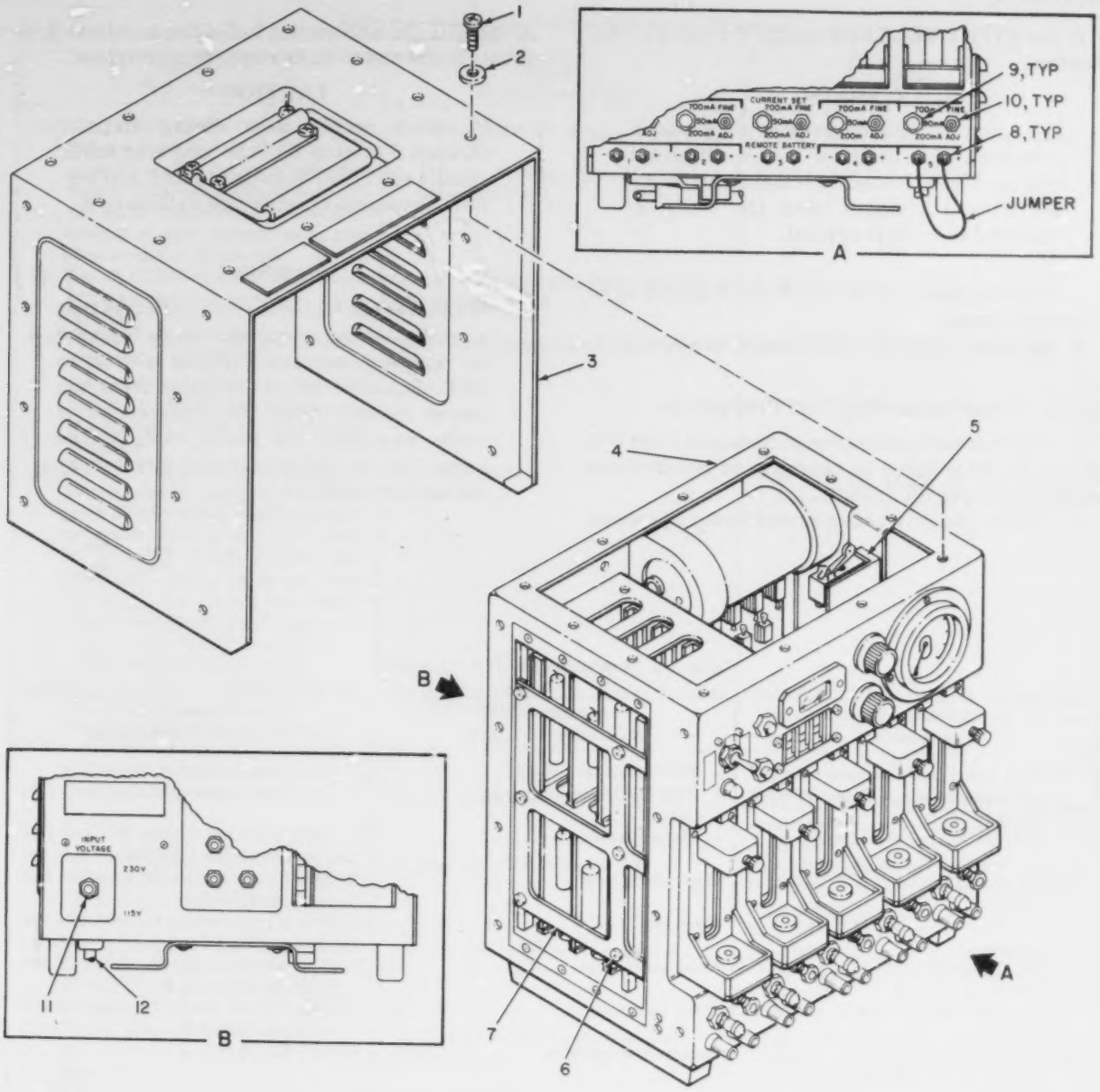
b. Retain interlock switch S6 (5) in closed position, by holding switch down using a heavy rubber band as wrapper.

c. Remove screws (6) holding retainer (7) to chassis and remove retainer.

d. Connect REMOTE BATTERY jacks (8) together, using clip leads, as follows:

(1) Channel 1, red to black
(2) Channel 2, red to black
(3) Channel 3, red to black
(4) Channel 4, red to black
(5) Channel 5, red to black

e. Set all CURRENT SET switches (9) to 50 mA position, and turn all FINE ADJ controls (10) fully counterclockwise.



LEGEND FOR FIGURE 3-1:

1. SCREW
2. WASHER
3. COVER
4. CHASSIS
5. INTERLOCK SWITCH S6
6. SCREW
7. RETAINER
8. REMOTE BATTERY JACKS
9. CURRENT SET SWITCH
10. FINE ADJUST CONTROL
11. INPUT VOLTAGE SWITCH
12. POWER CABLE

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Figure 3-1. Battery Charger, Preparation for Testing

f. Set INPUT VOLTAGE switch (11) to 115 VAC position.

WARNING

High voltage will be present on exposed terminals with interlock switch, S6 overridden. Use extreme care troubleshcoting the battery charger when the cover is removed and power applied.

g. Connect power cable (12) to 115 VAC, 50 or 60 Hz source power.

h. Set CHANNEL SELECT switch to position 1.

3-11. Troubleshooting Test Procedure

a. Perform test procedures as shown in table 3-3, in the sequence listed in column 1, to troubleshoot Battery Charger PP-7286/U.

b. Follow the instruction or reference in column 3, opposite the malfunction indication in column 2, to isolate faults and to make required corrections.

CAUTION

If meter needle pegs during steps 1 through 5 or step 8 of the following table, quickly set POWER switch to OFF and perform appropriate instruction in Column 3.

WARNING

Whenever the test procedure indicates that a printed wiring assembly is to be replaced or removed, set the POWER switch to OFF. Remove the power cable from the power source. After the replacement is made, reconnect the power cable to the power source and proceed as directed by the test procedure.

Table 3-3. Troubleshooting Test Procedures

Column 1 Test Procedure	Column 2 Malfunction Indication	Column 3 Reference, or Instruction
(1) With power cable connected to battery charger (para. 3-10), set POWER switch to ON. POWER ON lamp should light.	*a.* POWER switch trips off *b.* POWER ON lamp does not light. *c.* Meter needle pegs	*a.* Go to Test 1, para 3-12. *b.* Go to Test 2, para 3-12. *c.* Replace A6 per Section IV, para 3-14 and retest per Table 3-3.
(2) Set CHANNEL SELECT switch to position 2.	Meter needle pegs	Replace A7 per Section IV, para 3-14 and retest per Table 3-3.
(3) Set CHANNEL SELECT switch to position 3.	Meter needle pegs	Replace A8 per Section IV, para 3-14 and retest per Table 3-3.
(4) Set CHANNEL SELECT switch to position 4.	Meter needle pegs	Replace A9 per section IV, para 3-14 and retest per Table 3-3
(5) Set CHANNEL SELECT switch to position 5.	Meter needle pegs	Replace A10 per section IV, para 3-14 and retest per Table 3-3.
(6) Set VOLTAGE TEST SELECT switch to B1. Check panel meter reading.	Current flow indicated	Go to Test 3, para 3-12.
(7) Press VOLTAGE TEST switch. Check panel meter reading.	*a.* Less than 700 mA *b.* No reading	*a.* Go to Test 4, para 3-12. *b.* Send to next higher maintenance level.
(8) Turn SET CHARGE. Time thumbwheels to 10.0. Press START TIME switch. Turn CHANNEL SELECT switch through all 5 positions and observe panel meter.	Meter needle pegs at one or more positions of CHANNEL SELECT switch.	Go to Test 11, para 3-12.
(9) Turn SET CHARGE TIME thumbwheels to 18.8. Press START TIME switch. Check CHARGE TIME HOURS REMAINING	*a.* At least one module has wrong numbers displayed. *b.* No digits displayed	*a.* Go to Test 5, para 3-12. *b.* Go to Test 6, para 3-12.
(10) Set CHANNEL SELECT switch to 1. Set Channel 1 CURRENT SET switch and adjust FINE ADJ control for 50 mA reading on panel meter. Repeat for channels 2, 3, 4, and 5. Check panel meter reading.	*a.* 50 mA reading not shown on all channels, but there is a lesser reading on at least one channel. *b.* No reading on any channel	*a.* Go to Test 7, para 3-12. *b.* Go to Test 8, para 3-12.

Table 3-3. Troubleshooting Test Procedures—Continued

Column 1 Test Procedure	Column 2 Malfunction Indication	Column 3 Reference, or Instruction
(11) Set all CURRENT SET switches to 200 mA position. Set all FINE ADJ controls fully counterclockwise. Rotate CHANNEL SELECT switch to each of 5 channels. Check current reading at each position; to be less than or equal to 50 mA each.	*a.* Each channel shows more than 50 mA reading. *b.* At least one channel, but not all, reads more than 50 mA.	*a.* Send to next higher maintenance level *b.* Go to Test 9, para 3-12
(12) Set all CURRENT SET switches to 700 mA position. Repeat same procedure as in (11).	One or more channels shows reading of more than 200 mA.	Send to next higher maintenance level
(13) Set all CURRENT SET switches and FINE ADJ controls for full scale panel meter reading of 700 mA. Rotate CHANNEL SELECT to each of 5 channels. Check current reading of 700 mA.	One or more channels reading less than 700 mA.	Send to next higher maintenance level
(14) Set all CURRENT SET switches to 50 mA position, using a stopwatch, press START TIME switch and start stopwatch. Record exact time taken by CHARGE TIME HOURS REMAINING display to change from 18.8 to 18.7. (Do not wait more than 7 minutes for change.) Limits are: Low—5 minutes, 42 seconds High—6 minutes, 18 seconds	Not within limits.....	Turn POWER switch to OFF. Replace A12 per section IV, para 3-16 and Test per section V
(15) Set CHARGE TIME HOURS REMAINING to read 00.0. Press START TIME switch. Check display; to read .0 with button depressed, and to go blank when released.	One or more digits are displayed, when START TIME is released.	Turn POWER switch to OFF. Replace A12 per section IV, para 3-16 and Test per section V
(16) Check panel meter reading.....	Shows a current flow.....	Turn POWER switch to OFF. Replace A12 per section IV, para 3-16 and Test per section V
(17) Set CHARGE TIME HOURS REMAINING to 09.9. Press START TIME switch. Check display; to read 9.9.	Display shows 09.9 instead of 9.9	Turn POWER switch to OFF. Replace A12 per section IV, para 3-16 and Test per section V
(18) Set CHARGE TIME HOURS REMAINING to read 00.9. Press START TIME switch. Check display; to read .9.	Display shows 0.9 or 00.9 instead of .9	Turn POWER switch to OFF. Replace A12 per section IV, para 3-16 and Test per section V
(19) Repeat, as in (18), with setting at: 17.7 16.6 15.5 14.4 13.3 12.2 11.1 10.0	Display does not show same as setting....	Turn POWER switch to OFF. Replace A12 per section IV, para 3-16 and Test per section V
(20) Set CHARGE TIME HOURS REMAINING to read 18.8. Press START TIME switch. Remove power cable from 115 VAC input source. Using a stopwatch; time 10 seconds and reconnect power cable. Check display; to be unchanged.	Display not 18.8.....	Go to Test 10, para 3-12

Table 3-3. Troubleshooting Test Procedures—Continued

Column 1 Test Procedure	Column 2 Malfunction Indication	Column 3 Reference, or Instruction
(21) If troubleshooting tests are now completed, turn POWER switch to OFF. Remove power cable from 115 VAC source. Remove band from interlock switch, S6 and remove clip leads from REMOTE BATTERY jacks. Assemble retainer and cover and set controls per para 3-10e. Refer to figure 3-1.	None	None
(22) Connect power cable to 115 VAC. Set POWER switch to ON. POWER ON lamp should light.	Lamp does not light	Reposition switch S6; then, if no light, send to next higher maintenance level.
(23) Set POWER to OFF. Disconnect power cable. Return battery charger to service.		

3-12. Fault Isolation Tests

Tests, for use by direct support (DS) maintenance personnel, are included for specific components authorized for testing and replacement at DS level. These tests, with component references and descriptions, are as follows:

Test 1. Power Supply Assembly (A11) Short Circuit Test.

a. Remove printed wiring board assembly (A11, fig. 3-2) (no extender board to be used), and set POWER switch to ON.

(1) If POWER switch trips "off"; install A11 and go to step *b*.

(2) If POWER switch remains "on"; replace A11 (Section IV, para 3-15). Go to section V. .

b. Remove A6, A7, A8, A9, and A10 charging modules (fig. 3-2).

c. Set POWER switch to ON.

(1) If POWER switch remains "on"; set POWER "off"; install A6, and go to step *d*.

(2) If POWER switch trips "off"; discontinue testing and forward battery charger to next higher maintenance level.

d. Set POWER switch to ON.

(1) If POWER switch remains "on"; set POWER "off"; install A7, and go to step *e*.

(2) If POWER switch trips "off," replace A6 (Section IV, para 3-14), install A7, A8, A9, and A10. Go to section V.

e. Set POWER switch to ON.

(1) If POWER switch stays "on," set POWER "off," install A8, and go to step *f*.

(2) If POWER switch trips "off," replace A7 (Section IV, para 3-14), install A8, A9, and A10. Go to section V.

f. Set POWER switch to ON.

(1) If POWER switch stays "on," set POWER "off," install A9, and go to step *g*.

(2) If POWER switch trips "off," replace A8 (Section IV, para 3-14), re-install A9 and A10. Go to section V.

g. Set POWER switch to ON.

(1) If POWER switch stays "on," set POWER "off," install A10, and go to step *h*.

(2) If POWER switch trips "off," replace A9 (Section IV, para 3-14), re-install A10. Go to section V.

h. Set POWER switch ON.

(1) If POWER switch stays "on," return to table 3-3.

(2) If POWER switch trips "off," replace A10 (Section IV, para 3-14), and go to section V.

Test 2. POWER ON Lamp (DS1) Test.

a. Set POWER to OFF.

b. Remove lens cap, with lamp from charger.

c. Using Rx 100 scale of multimeter, measure resistance of lamp.

(1) If resistance is less than 500 ohms, go to step *d*.

(2) If resistance is more than 500 ohms, replace lamp. Go to section V.

d. Set POWER to OFF and check that battery charger interlock switch (S6) arm is firmly held in the down (closed) position.

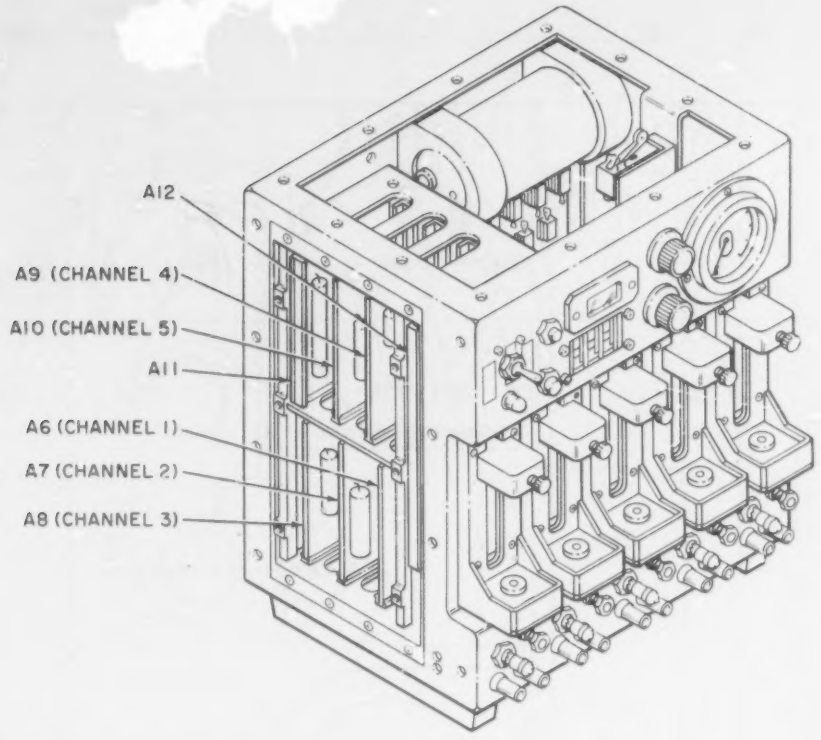
(1) If interlock switch is firmly held down, discontinue testing and forward charger to next higher maintenance level.

(2) If interlock switch is not firmly held down, firmly hold switch arm down with a rubber band. Return to table 3-3.

Test 3. Relay Control Test.

a. Set POWER to OFF.

b. Connect oscilloscope probe to test point S3-TP1 (fig. 3-3) on terminal board (TB1). Connect return lead to TB1-E21. Measure DC voltage.



NOTE:
BATTERY CHARGER COVER AND PRINTED WIRING BOARD RETAINER REMOVED FOR CLARITY.

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Figure 3-2. References and Locations, Battery Charger PP-7286/U

(1) If DC voltage is 0.5 volt or less, go to step *c*.

(2) If DC voltage is more than 0.5 volt; discontinue testing, send battery charger to next higher maintenance level.

c. Connect oscilloscope probe to A11-TP4 (fig. 3-4). Connect return lead to A11-TP6. Set oscilloscope controls to trigger internally from a positive 5 to 10 VDC pulse. Use extender board if necessary (para 3-9*b*).

d. Set POWER switch to ON, to see oscilloscope waveform. Move POWER switch to ON and OFF a few times to see waveform appear each time POWER is turned "on." Compare waveform on oscilloscope with battery charger typical troubleshooting waveform (fig. 3-5).

(1) If typical waveform (fig. 3-5) is seen on oscilloscope; go to step *e*.

(2) If waveform is not like figure 3-5, or there is no waveform; go to step *g*.

e. Check panel meter reading.

(1) Current reading; go to step *f*.

(2) No current flow; set POWER "off"; go to table 3-3.

f. Set POWER switch to OFF. Remove oscilloscope probe from A11-TP4 and connect probe to TB1-E8 (fig. 3-3). Connect return lead to TB1-E11. Set POWER to ON. Measure DC voltage.

(1) If voltage is less than 5 VDC; discontinue testing, send battery charger to next higher maintenance level.

(2) If voltage is 5 VDC or more; set POWER to OFF, replace A11 power supply assembly (Section IV, para 3-15); go to section V.

g. Set POWER switch to OFF. Remove oscilloscope probe from A11-TP4 and connect to A12 (fig. 3-2) using pin 32 on extender board (para 3-9*b*). Connect return lead to A12 pin 36.

h. Set POWER switch to ON, to see oscilloscope waveform. Waveform can be seen each time POWER switch is turned to ON. Turn POWER "on-off" a few times; to see and compare with typical waveform (fig. 3-5).

(1) If waveform on oscilloscope is same as figure 3-5; go to step *i*.

(2) If waveform is not same as figure 3-5; go to step *j*.

i. Check panel meter reading.

(1) If current reading; discontinue testing.

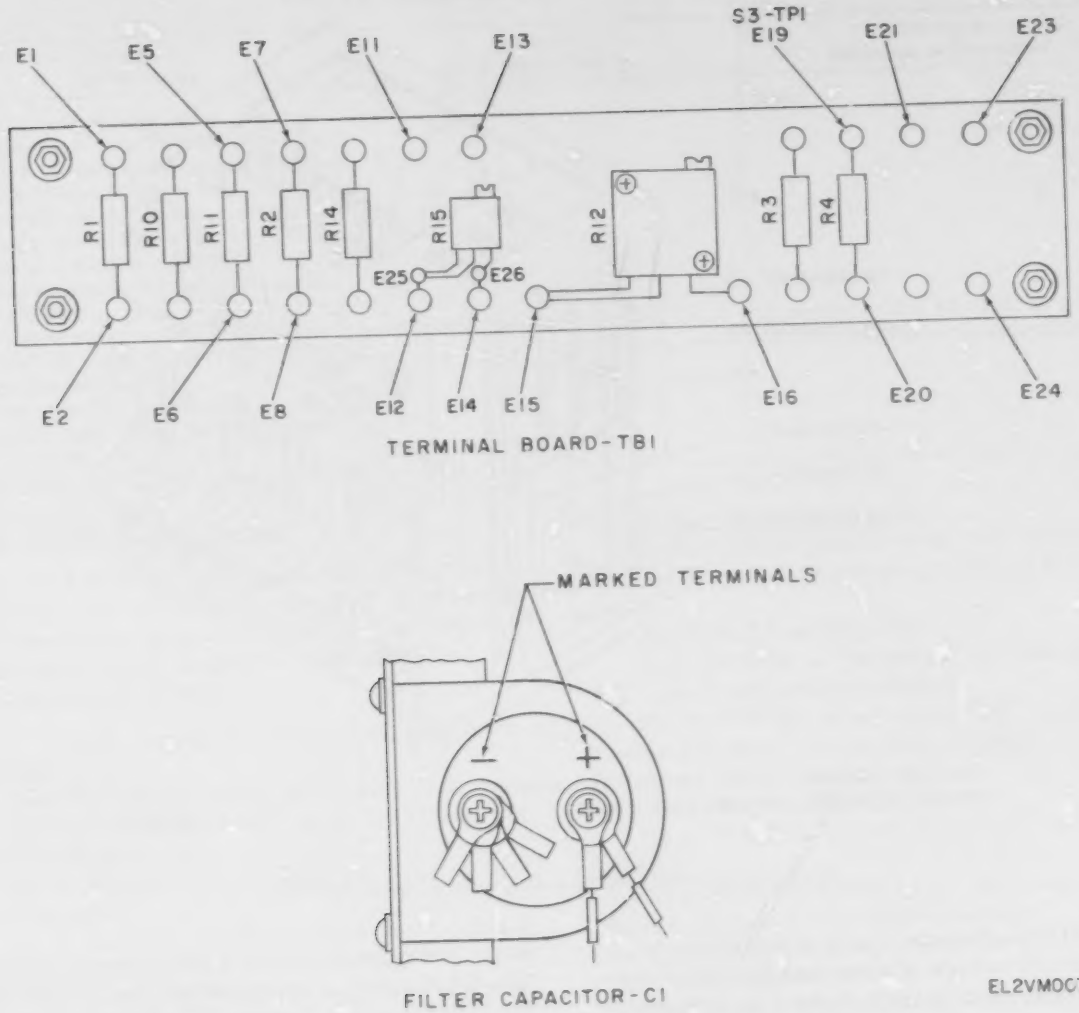


Figure 3-3. Terminal Board (TB1) and Capacitor (C1) Test Points, Battery Charger PP-7286/U

send battery charger to next higher maintenance level.

(2) Does not show current flow; set POWER to OFF, return to table 3-3.

j. Set POWER switch to OFF. Remove oscilloscope probe from A12-32 and connect to A12-TP2 (fig. 3-6).

k. Set POWER switch to ON. Measure DC voltage.

(1) If DC voltage is 7 VDC or more; set POWER to OFF, replace A12 timing circuit assembly (Section IV, para 3-16), and go to section V.

(2) If DC voltage is less than 7 VDC; discontinue testing, send battery charger to next higher maintenance level.

Test 4. Memory Battery (B1) Sensor Resistor Test.

a. Set POWER switch to ON.

b. Set multimeter to 10 VDC scale.

c. Connect negative (−) lead of multimeter to negative (−) terminal on capacitor C1 (fig. 3-3).

d. Connect positive (+) lead of multimeter to TB1-E7 (fig. 3-3) and observe multimeter.

(1) If meter reading is 7.0 volts or more, discontinue testing and send battery charger to next higher maintenance level.

(2) If meter reading is less than 7.0 volts, set POWER switch to OFF. Replace memory battery (TM 11-6130-392-12). Go to section V.

Test 5. Display Circuit Assembly (A13) and Display Modules (U1, U2, U3) Test.

a. Check display reading.

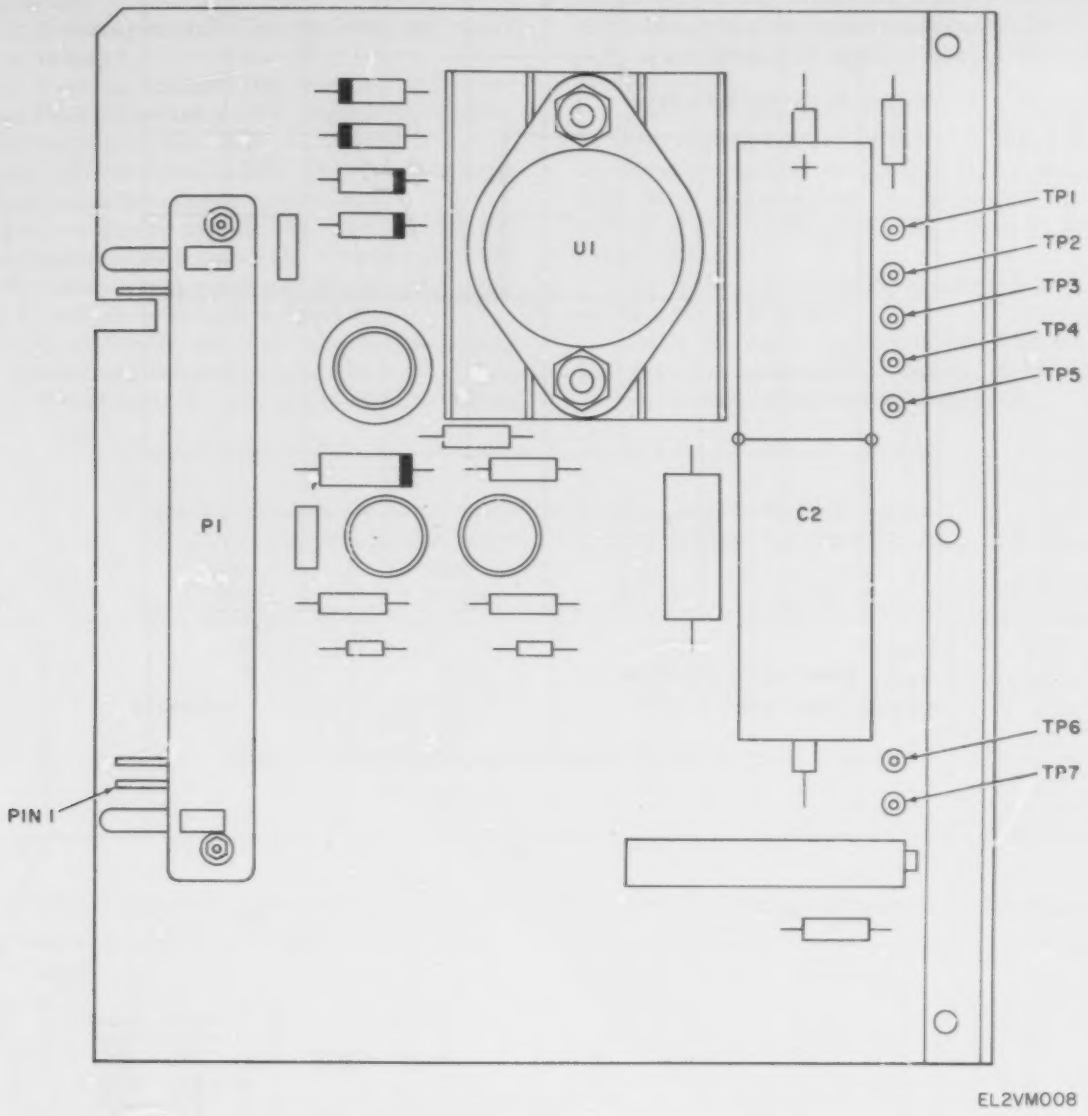


Figure 3-4. Power Supply Assembly (A11) Terminal and Test Point Locations

(1) If any display modules are blank; go to step *b*.

(2) If at least one display module reads same as thumbwheel switch setting, and no modules are blank; go to step *d*.

(3) If all three display modules read wrong digit; go to step *l*.

b. Set POWER switch to OFF. Refer to section IV, paragraph 3-17; dissemble A13, and interchange module showing blank with one that is not blank.

c. Set POWER to ON. Press START TIME switch.

(1) If display module that was blank in step *a*., is still blank; set POWER to OFF, and replace this faulty display module and reassemble A13 (Section IV, para 3-17). Go to section V.

(2) If display module, that was blank in step *a*., is now reading correctly; set POWER to OFF, replace timing circuit assembly A12 (Section IV, para 3-16), and reassemble display circuit assembly A13. Go to section V.

d. Set POWER switch to OFF. Refer to section IV, paragraph 3-17 for maintenance instructions and interchange the good display module with one that reads wrong.

e. Set POWER switch to ON. Press START

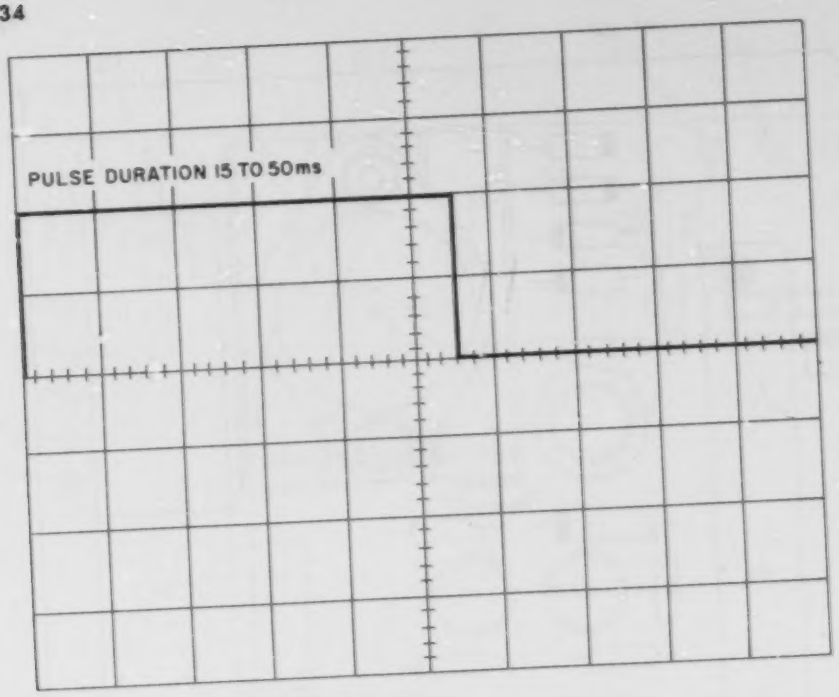


Figure 3-5. Waveform, Typical Troubleshooting, Battery Charger PP-7286/U

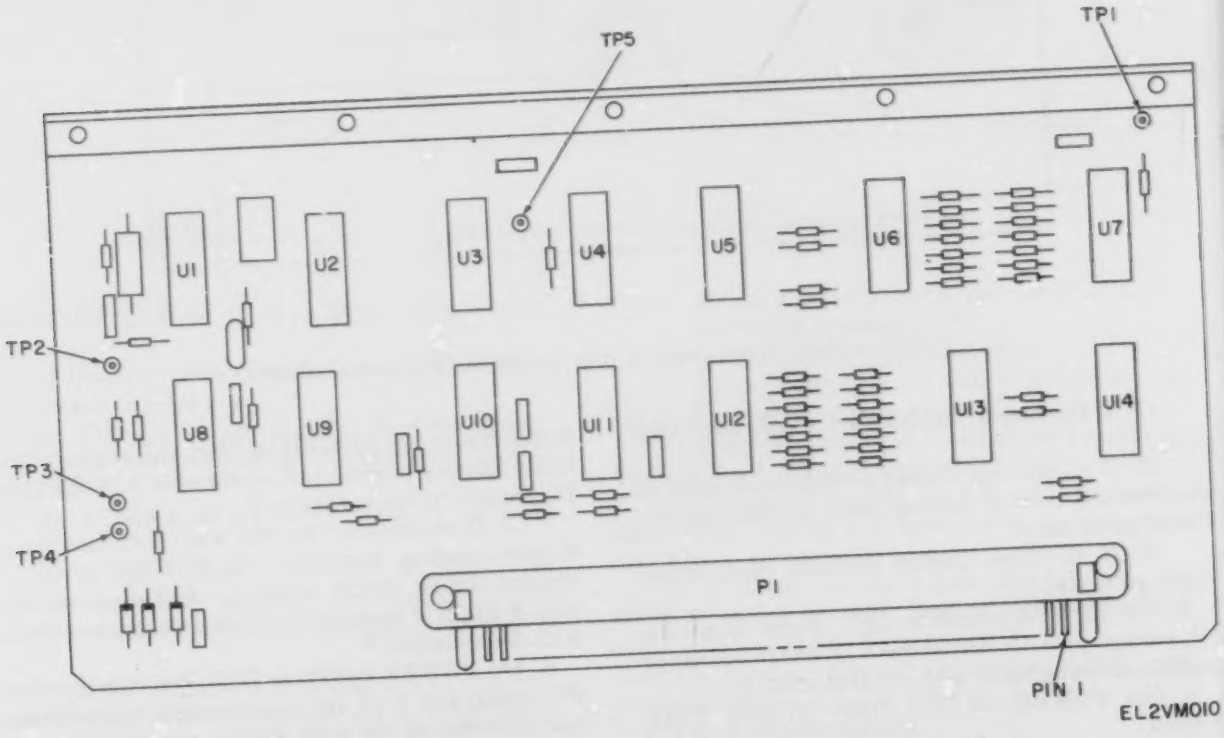


Figure 3-6. Timer Printed Wiring Assembly (A12) Terminal and Test Point Locations

TIME switch.

(1) If display module that was bad, now reads good, go to step *f*.

(2) If display module, that was bad, still reads bad; set POWER switch to OFF, replace this display module (Section IV, para 3-17). Go to section V.

f. Set POWER switch to OFF. Refer to paragraph 3-9*b*. and put A12 on the extender board.

g. Remove display module that reads wrong. Using multimeter, check continuity between each pin of display module socket and appropriate pin on A12 timing circuit. Refer to table 3-4 and figure 3-7.

(1) If continuity for each pin on the display module socket is good, go to step *h*.

(2) If continuity for any of the display module socket pins is bad, disconnect testing. Forward battery charger to next higher maintenance level.

h. Insert removed display module into display module socket.

i. Set POWER switch to ON.

j. Set multimeter to 10 VDC scale. Connect negative lead to negative terminal of capacitor C1 (fig. 3-3). With positive lead of multimeter, measure voltage at pins 1, 27 and 28 of A12 timing circuit assembly (fig. 3-6).

(1) If the meter reading is 9.0 volts or greater for each pin, go to step *k*.

(2) If the meter reading is less than 9.0 volts for any pin; discontinue testing, send battery charger to next higher maintenance level.

Table 3-4. Connections Between Display Module Sockets and A12 Timing Circuit Assembly.

From A13-U1 pin	To A12 pin	From A13-U2 pin	To A12 pin	From A13-U3 pin	To A12 pin
1	12	1	14	1	N/C
2	38	2	38	2	38
3	6	3	18	3	N/C
4	7	4	17	4	N/C
5	5	5	19	5	29
6	10	6	15	6	N/C
7	9	7	16	7	N/C
8	8	8	20	8	30

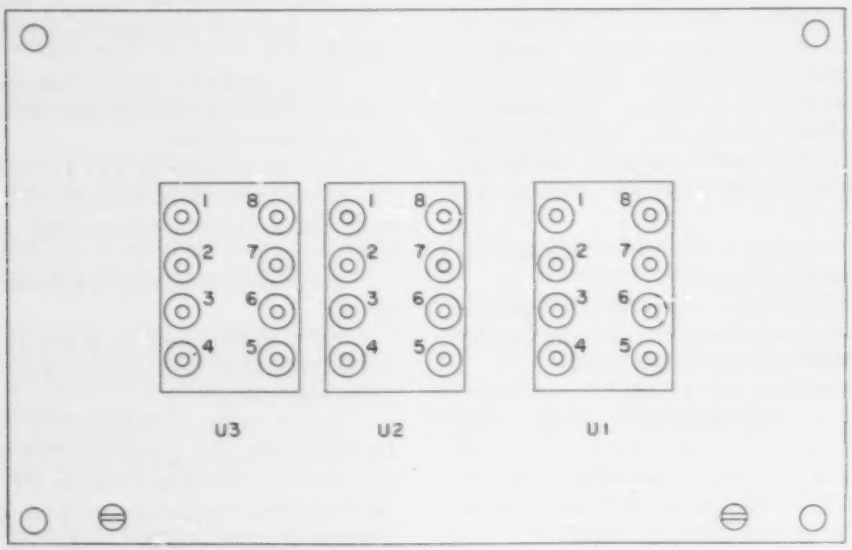


Figure 3-7. Test Point Locations, Display Module Sockets

k. With positive lead of multimeter, measure voltage at pins 2, 3, 4, 13, 22 and 26 of A12 timing circuit assembly.

(1) If the meter reading is less than 1 volt for each pin, set POWER switch to OFF and replace A12 (Section IV, para. 3-16).

(2) If the meter reading is 1 volt or more for any pin; discontinue testing, send battery charger to next higher maintenance level. Go to section V.

l. Set POWER switch to OFF. Remove all display modules. Be sure to remember which module goes into each socket. Refer to section IV, paragraph 3-17 for disassembly instructions.

m. Refer to paragraph 3-9*b.* and put A12 timing circuit assembly (fig. 3-6) on extender board.

n. Using multimeter, check continuity between each pin of each display module socket and the appropriate pin on A12. Refer to table 3-4 and figure 3-7.

(1) If continuity is good for every pin, go to step *o*.

(2) If continuity is not good for all of the pins; discontinue testing, send battery charger to next higher maintenance level.

o. Insert display modules into their original sockets.

p. Remove and interchange any two of the display modules.

q. Set POWER switch ON. Press START TIME switch.

(1) If display reads exactly the same as in step *a;* go to step *r*.

(2) If display does not read exactly the same as in step *a;* set POWER switch to OFF. Replace all display modules and reassemble display circuit assembly A13 (Section IV, para 3-17). Go to section V.

r. Set multimeter to 10 VDC scale. Connect negative lead to negative (−) lead of C1 (fig. 3-3). With positive (+) lead of multimeter, measure voltages at pins 1, 27, and 28 of A12 timing circuit assembly (fig. 3-6).

(1) If meter reading is 9.0 volts or greater for each pin measured, go to step *s*.

(2) If meter reading is less than 9.0 volts for any pin measured, discontinue testing, send battery charger to next higher maintenance level.

s. With positive lead of multimeter, measure voltage at pins 2, 3, 4, 13, 22 and 26 of A12 timing circuit assembly.

(1) If the meter reading is less than 1 volt for each pin, set POWER switch to OFF and replace A12 (Section IV, para 3-16). Go to section V.

(2) If the meter reading is 1 volt or more for any pin; discontinue testing, send battery charger to next higher maintenance level.

Test 6. 10 Volt Power Supply Test.

a. Check Panel Meter.

(1) If meter shows current reading; go to step *b*.

(2) If no current reading on meter; go to step *e*.

b. Set POWER to OFF. Refer to paragraph 3-9*b.* and put A12 (fig. 3-2) on extender board.

c. Set multimeter to 10 VDC scale. Connect negative meter lead to negative (−) terminal of filter capacitor C1 (fig. 3-3). Connect positive (+) lead to A12-TP2 (fig. 3-6). Set POWER to ON.

(1) If the meter reading is 7.0 volts or more; go to step *d*.

(2) If the meter reading is less than 7.0 volts; discontinue testing, send battery charger to next higher maintenance level.

d. Remove positive lead of multimeter from A12-TP2 and connect to S3-TP1 (fig. 3-3).

(1) If meter reading is less than 7.0 volts; discontinue testing, send battery charger to next higher maintenance level.

(2) If meter reading is 7.0 volts or more; set POWER to OFF, replace A12 (Section IV, para 3-16), go to section V.

e. Set POWER to OFF. Remove F6 fuse (fig. 2-2); check continuity with multimeter.

(1) If F6 is good; go to step *f*.

(2) If F6 is faulty; go to step *m*.

f. Refer to paragraph 3-9*b.* and put A11 power supply assembly (fig. 3-2) on extender board. Insert F6 fuse and screw-on cap.

g. Set POWER to ON. Set multimeter to 50 VAC scale. Measure A11 (fig. 3-4) AC volts between pins A11-22 and A11-23 on extender board.

(1) If meter reading is 7.0 volts or more; go to step *h*.

(2) If meter reading is less than 7.0 volts; discontinue testing, send battery charger to next higher maintenance level.

h. Set multimeter to 10 VDC scale. Connect multimeter negative lead to negative (−) lead of C1 (fig. 3-3). Connect the positive lead to A11-TP3 (fig. 3-4).

(1) If meter reading is 7.0 volts or more; go to step *i*.

(2) If meter reading is less than 7.0 volts; set POWER to OFF, and replace A11 (Section IV, para 3-15). Go to section V.

i. Set POWER switch to OFF. Remove positive lead of multimeter from A11-TP3. Remove A11 and the extender board and return A11 into its original location. Refer to paragraph 3-9*b.* and put A12 (fig. 3-2) on extender board.

j. Set POWER switch ON. Connect positive lead of multimeter to A12 (fig. 3-6) by using pin 41 on extender board.

(1) If meter reading is 7.0 volts or more; go to

step *k*.

(2) If meter reading is less than 7.0 volts; discontinue testing, send battery charger to next higher maintenance level.

k. Remove positive lead of multimeter from A12 pin 41 and connect it to A12 pin 34.

(1) If meter reading is 7.0 volts or more; go to step *l*.

(2) If meter reading is less than 7.0 volts; discontinue testing, send battery charger to next higher maintenance level.

l. Press START TIME switch. Check multimeter while switch is pressed.

(1) If meter reading is 0.1 volt or less; set POWER switch to OFF, and replace A12 (Section IV, para 3-16). Go to Section V.

(2) If meter reading is more than 0.1 volt; discontinue testing, send battery charger to next higher maintenance level.

m. Refer to paragraph 3-9*b*. and put A11 (fig. 3-2) on the extender board.

n. Set multimeter to 10 VDC scale. Connect negative multimeter lead to negative (−) lead of C1 (fig. 3-3). Connect positive lead (+) to A11 by using pin 20 on extender board.

(1) If meter reading is between 9.0 and 10.0 volts; go to step *o*.

(2) If meter reading is not between 9.0 and 10.0 volts; set POWER switch OFF, and replace A11 (Section IV, para 3-15) and F6. Go to section V.

o. Set POWER switch OFF. Remove positive lead of multimeter from A11 pin 20 and set multimeter to the Rx1 scale. Connect positive lead to A11 pin 14 on extender board.

(1) If meter reading is 20 ohms or less; go to step *p*.

(2) If meter reading is greater than 20 ohms; go to step *r*.

p. Remove A12 and check multimeter.

(1) If meter reading is 20 ohms or less, go to step *q*.

(2) If meter reading is greater than 20 ohms; replace A12 (Section IV, para 3-16) and F6 (fig. 2-2). Go to section V.

q. Insert A12 into its original position. Remove both leads of multimeter from battery charger and remove A11. Connect leads of multimeter to pins 13 and 14 of A11 and check multimeter.

(1) If meter reading is 20 ohms or less, replace A11 (Section IV, para 3-15) and F6 (fig. 2-2). Go to section V.

(2) If meter reading is greater than 20 ohms; discontinue testing, send battery charger to next higher maintenance level.

r. Remove positive lead from A11 pin 14 and connect it to A11 pin 18.

(1) If meter reading is 20 ohms or less; go to step *s*.

(2) If meter reading is greater than 20 ohms; replace F6 (fig. 2-2). Go to section V.

s. Remove A6 (fig. 3-2) and check multimeter.

(1) If meter reading is 20 ohms or less, go to step *t*.

(2) If meter reading is greater than 20 ohms, replace A6 (Section IV, para 3-14) and F6 (fig. 2-2). Go to section V.

t. Insert A6 into its original location. Remove A7 (fig. 3-2); check multimeter.

(1) If meter reading is 20 ohms or less, go to step *u*.

(2) If meter reading is greater than 20 ohms, replace A7 (Section IV, para 3-14) and F6 (fig. 2-2). Go to section V.

u. Insert A7 into its original location. Remove A8 (fig. 3-2); check multimeter.

(1) If meter reading is 20 ohms or less, go to step *v*.

(2) If meter reading is greater than 20 ohms, replace A8 (Section IV, para 3-14) and F6 (fig. 2-2). Go to section V.

v. Insert A8 into its original location. Remove A9 (fig. 3-2); check multimeter.

(1) If meter reading is 20 ohms or less, go to step *w*.

(2) If meter reading is greater than 20 ohms, replace A9 (Section IV, para 3-14) and F6 (fig. 2-2). Go to section V.

w. Insert A9 into its original location. Remove A10 (fig. 3-2); check multimeter.

(1) If meter reading is 20 ohms or less, go to step *x*.

(2) If meter reading is greater than 20 ohms, replace A10 (Section IV, para 3-14) and F6 (fig. 2-2). Go to section V.

x. Insert A10 into its original location. Remove both multimeter leads from battery charger and remove A11. Connect multimeter leads to pins 12 and 18 of the A11 board.

(1) If meter reading is 20 ohms or less; replace A11 (Section IV, para 3-14) and F6 (fig. 2-2). Go to section V.

(2) If meter reading is greater than 20 ohms; discontinue testing, send battery charger to the next higher maintenance level.

Test 7. Charging Circuit Printed Wiring Assemblies (A6-10) Test.

a. For channels that could not be adjusted for a meter reading of 50 mA; determine if there was a (or some lesser) reading.

(1) If no reading at all, on questionable channel(s), go to step *f*.

(2) If there was a meter reading, on question-

able channel(s), go to step *b*.

b. Determine if any channels, that had a meter reading, could be adjusted for a 50 mA reading.

(1) If any of the channels could be adjusted for a meter reading of 50 mA; go to step *c*.

(2) If no channel could be adjusted for a meter reading of 50 mA; go to step *n*.

c. Set POWER to OFF; position CHANNEL SELECT switch to channel that could not be adjusted for meter reading of 50 mA.

d. Remove charging module (assemblies A6-A10) of a channel (fig. 3-2 and fig. 3-8) that could not be adjusted for a meter reading of 50 mA; replace it with a charging module from a channel that was adjusted for a 50 mA meter reading.

e. Set POWER to ON; press START TIME switch. Adjust FINE ADJ for this channel which now has a good charging module.

(1) If FINE ADJ can now be adjusted to 50 mA meter reading; set POWER to OFF, replace the faulty charging module (Section IV, para 3-14). Go to section V.

(2) If FINE ADJ cannot be adjusted to 50 mA meter reading; discontinue testing, send battery charger to next higher maintenance level.

f. Set POWER to OFF. Set CHANNEL SELECT switch to faulty channel, and remove fuse for same faulty channel. Using multimeter; check fuse for continuity.

(1) If fuse is good; reinstall, and go to step *l*.

(2) If fuse is faulty; go to step *g*.

g. Set multimeter to 250 VDC scale. Connect negative (−) lead to negative (−) terminal of C1 (fig. 3-3). Connect positive (+) lead to A11-TP7 (fig. 3-4) using extender board if necessary (para 3-9*b*.). Set POWER to ON; check multimeter.

(1) If voltage is less than or equal to 100 VDC; go to step *h*.

(2) If voltage is more than 100 VDC; discontinue testing, send battery charger to next higher maintenance level.

h. Remove charging module (A6, A7, A8, A9, or A10) for this faulty channel (fig. 3-2).

i. Set multimeter to Rx1 scale. Connect one of the leads to negative (black) jack of same faulty channel (1, 2, 3, 4, or 5). Connect other lead to exposed metal (for grounding) on chassis; check multimeter.

(1) If meter reading is 20 ohms or less; discontinue testing, send battery charger to depot.

(2) If meter reading is greater than 20 ohms; go to step *j*.

j. Replace bad fuse of this channel; reinstall charging module into its original location.

k. Set POWER to ON; press START TIME switch, and check panel meter.

(1) If meter indicates a current reading; return to table 3-3.

(2) If there is no meter reading; replace charging module (A6, A7, A8, A9, or A10) just installed and replace fuse for faulty channel. Go to section V.

l. Remove charging module (assemblies A6-A10) for the faulty channel (fig. 3-2); replace with charging module from a good channel.

m. Set POWER to ON; press START TIME switch and check panel meter.

(1) If meter indicates a current reading; set POWER to OFF, and replace charging module removed in step *l*. Go to section V.

(2) If meter does not indicate current flow; set POWER to OFF, discontinue testing and send battery charger to depot.

n. Set POWER to OFF. Remove power supply assembly A11 (fig. 3-2) from battery charger. Refer to paragraph 3-9*b* and put on extender board.

o. Set multimeter to 10 VDC scale. Connect negative lead to negative terminal of capacitor C1 (fig. 3-3). Connect positive lead of multimeter to A11-TP3.

p. Set POWER to ON; check multimeter.

(1) If meter reading is 9.5 ± 0.5 volts; discontinue testing, send battery charger to next higher maintenance level.

(2) If meter reading is less than 9.5 ± 0.5 volts; set POWER switch to OFF and replace A11 (Section IV, para. 3-15). Go to section V.

Test 8. Power Supply Assembly (A11) Test.

a. Set POWER to OFF. Remove charging circuit assembly A9 (fig. 3-2) from battery charger. Refer to paragraph 3-9*b*. and put on extender board.

b. Set multimeter to 250 VDC scale. Connect negative (−) lead to negative (−) terminal of filter capacitor C1 (fig. 3-3). Connect positive (+) lead to A9-TP2 (fig. 3-8) test point.

c. Set POWER to ON. Press START TIME switch. Check multimeter.

(1) If meter reading is less than 20 VDC or more than 100 VDC; set POWER to OFF, discontinue testing, send battery charger to next higher maintenance level.

(2) If meter reading is more than 20 VDC but less than 100 VDC; go to step *d*.

d. Move positive (+) lead on multimeter from A9-TP2 to A9-TP4. Set multimeter to 10 VDC scale and check reading.

(1) If meter reading is 7.0 volts or more; go to step *e*.

(2) If meter reading is less than 7.0 volts; go to step *g*.

e. Set POWER to OFF. Remove fuses F1 through F5 (fig. 2-2) and check each for continuity with multimeter.

(1) If any one fuse is good; discontinue testing,

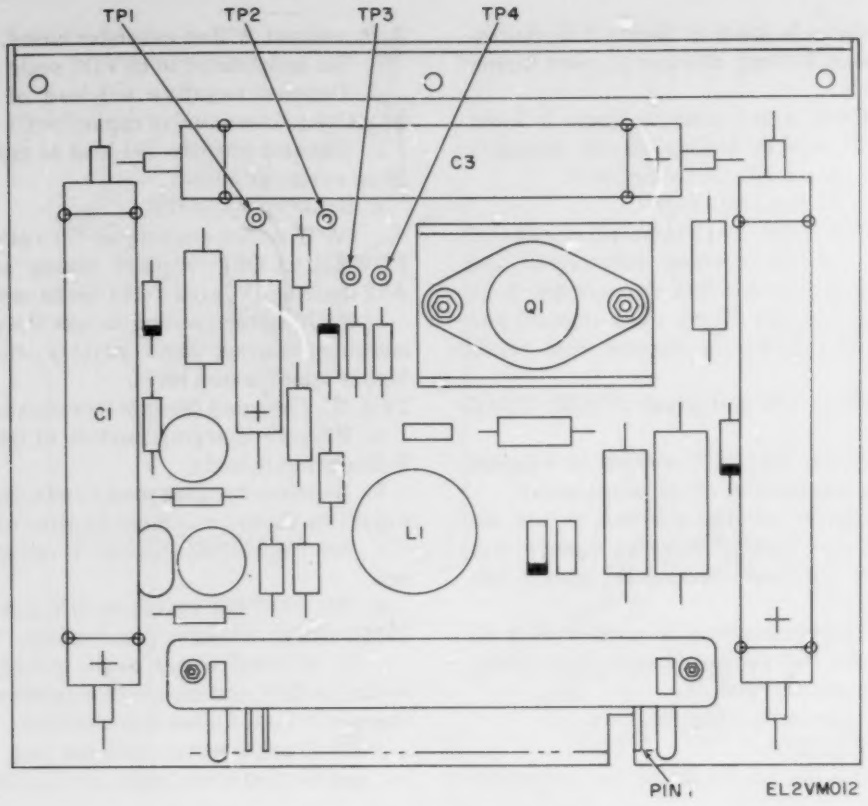


Figure 3-8. Charging Module (Assemblies A6-A10) Terminal and Test Point Locations

send battery charger to next higher maintenance level.

(2) If all fuses are faulty; replace F1 (fig. 2-2) only and set CHANNEL SELECT switch to 1.

f. Set POWER to ON. Press START TIME switch. Check panel meter.

(1) If panel meter shows current flow; set POWER to OFF, replace fuses F2 through F5 (fig. 2-2). Go to section V.

(2) If panel meter shows no current flow; discontinue testing, send battery charger to next higher maintenance level.

g. Set POWER to OFF. Remove multimeter positive (+) lead from A9-TP4. Remove extender board, put A9 back in original location (fig. 3-2).

h. Refer to paragraph 3-9*b*. and put power supply assembly A11 (fig. 3-2) on extender board.

i. Set multimeter to 10 VDC scale. Connect positive lead of multimeter to A11-TP2 (fig. 3-4).

j. Set POWER to ON. Press START TIME switch. Check multimeter reading.

(1) If meter reading is 7.0 VDC or more; discontinue testing, send battery charger to next higher maintenance level.

(2) If meter reading is less than 7.0 VDC: set POWER to OFF. Go to step *k*.

k. Connect oscilloscope probe to A11-TP5, and connect return lead to A11-TP6. Set oscilloscope control to trigger internally from a positive 10 VDC pulse.

l. Set POWER to ON. Press START TIME switch. Waveform will show on oscilloscope each time START TIME switch is pressed. Press START TIME a few times; check waveform, to be same as figure 3-5.

(1) If waveform (fig. 3-5) is same A12 is good; set POWER to OFF, replace A11 (refer to Section IV, para 3-15). Go to section V.

(2) If waveform is not the same as figure 3-5; set POWER to OFF, remove probe from A11-TP5.

m. Remove extender board. Return A11 power supply assembly to original location (fig. 3-2). Refer to paragraph 3-9*b*. and put timing circuit assembly A12 (fig. 3-2) on extender board.

n. Connect oscilloscope probe to pin 31 on A12 extender board. Connect return lead to pin 36. Set POWER to ON; press START TIME switch, check oscilloscope waveform (fig. 3-5). Press START TIME switch a few times. Compare waveform on oscilloscope, to figure 3-5.

(1) If waveform is same as figure 3-5; discontinue testing, send battery charger to next higher maintenance level.

(2) If waveform is not same as figure 3-5; set POWER to OFF, replace timing circuit assembly A12 (Section IV, para 3-16). Go to section V.

Test 9. Minimum Current Set Test.

a. Set POWER to OFF. Determine which channel (A6-channel 1, etc.) is reading incorrectly and remove charging module for that channel (fig. 3-2). Remove charging module of any good channel and insert it into the location of channel that reads incorrectly.

b. Set POWER to ON and press START TIME switch.

c. Set CHANNEL SELECT switch to channel that was reading incorrectly; check panel meter.

(1) If panel meter reading is 50 mA or less, set POWER to OFF and replace charging module that has already been removed (Section IV, para 3-14). Go to section V.

(2) If panel meter reading is greater than 50 mA discontinue testing. Forward battery charger to next higher maintenance level.

Test 10. Timing Assembly (A12) Test.

a. Set POWER to OFF.

b. Remove A12 (fig. 3-2). Refer to paragraph 3-9*b*. and put A12 on extender board.

c. Set multimeter to 10 VDC scale.

d. Connect negative (−) lead of multimeter to negative (−) terminal of capacitor C1 (fig. 3-3).

e. Connect positive (+) lead of multimeter to pin 33 on extender board.

f. Set POWER to ON.

(1) If meter reading is 7.0 volts or more; set POWER to OFF, replace timing assembly board A12 (Section IV, para 3-16). Go to section V.

(2) If meter reading is less than 7.0 volts; discontinue testing, send battery charger to next higher maintenance level.

Test 11. Charging Module Overvoltage Test.

a. Remove charging module of bad channel (fig. 3-2) and put it aside.

b. Remove charging module of a good channel and put it into basket assembly location of bad channel.

c. Set CHANNEL SELECT switch to bad channel.

d. Set POWER switch to ON and press START TIME switch. Observe panel meter.

(1) If panel meter pegs, quickly set POWER switch to OFF and discontinue testing. Send battery charger to next higher maintenance.

(2) If panel meter does not peg, replace charging module that is set aside. Go to section V.

Section IV. MAINTENANCE OF BATTERY CHARGER

3-13. General

Repair of battery charger at direct support level is limited to replacement of items listed in paragraph 3-3.

WARNING

Set POWER switch to OFF and disconnect power cable from power source before performing any maintenance inside battery charger.

3-14. Charging Modules (A6, A7, A8, A9, and A10)

Removal and installation of any charging module (fig. 3-9) is as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4). Remove cover from chassis.

(2) Remove screws (5) holding retainer (6) to chassis. Remove retainer.

(3) Carefully pull defective charging module from connector.

b. Installation.

(1) Push replacement charging module into connector.

(2) Perform an operational check of battery charger in accordance with section V.

(3) Install retainer (6) on chassis (4) and fasten with screws (5).

(4) Install cover (3) on chassis and fasten with screws (1) and washers (2).

3-15. Power Supply Assembly (A11)

Removal and installation of power supply assembly (fig. 3-9) is as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4). Remove cover from chassis.

(2) Remove screws (5) holding retainer (6) to chassis. Remove retainer.

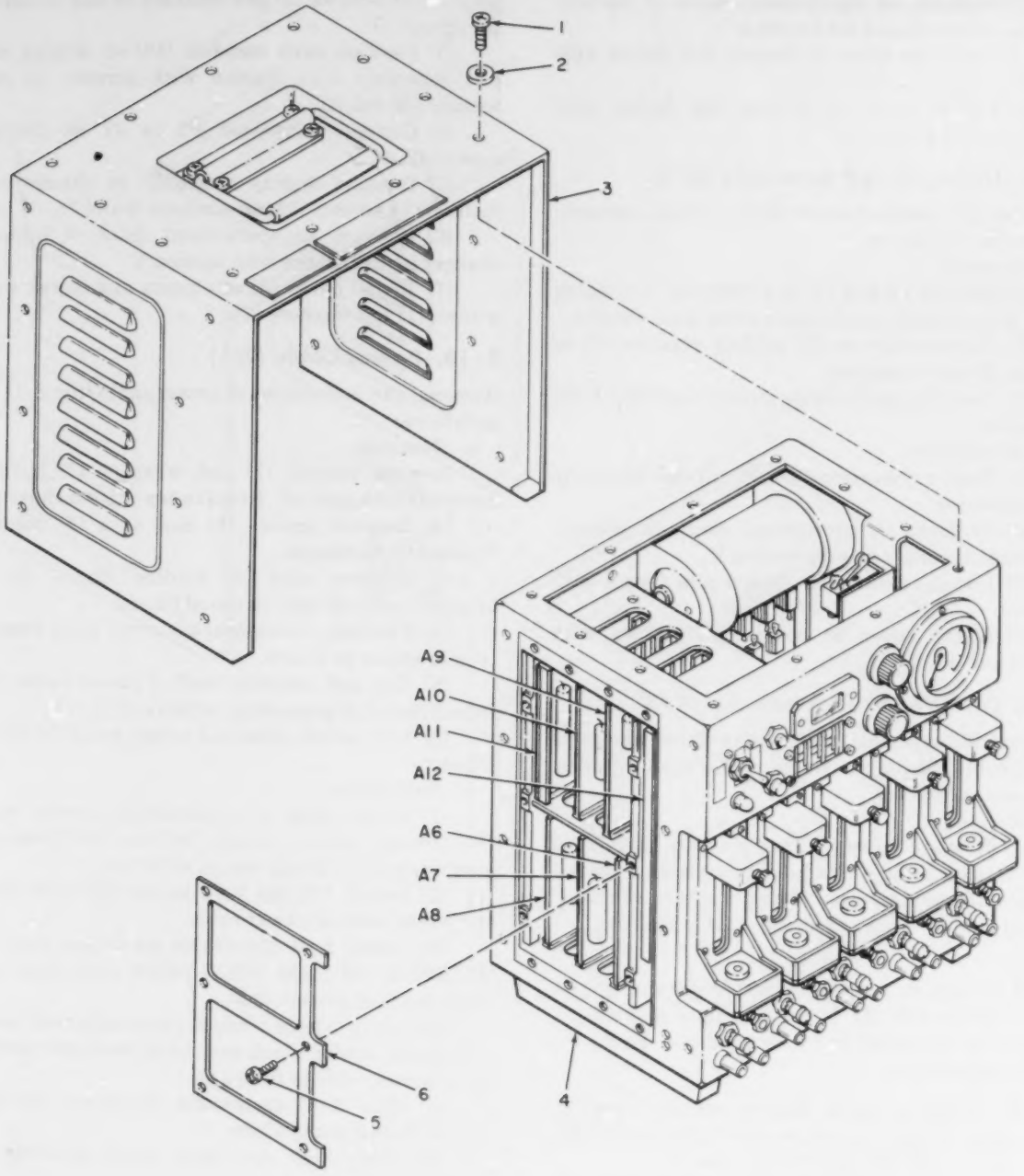
(3) Carefully pull power supply assembly from connector.

b. Installation.

CAUTION

Be sure wiring to circuit breaker/switch, CB1 (POWER) does not interfere, when installing replacement power supply assembly.

(1) Push replacement power supply assembly into connector.



LEGEND FOR FIGURE 3-9:

1. SCREW (28)
2. WASHER (28)
3. COVER
4. CHASSIS
5. SCREW (6)
6. RETAINER

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Figure 3-9. Printed Wiring/Board Assemblies Removal and Installation

(2) Perform an operational check of battery charger in accordance with section V.

(3) Install retainer on chassis and fasten with screws.

(4) Install cover on chassis and fasten with screws and washers.

3-16. Timing Circuit Assembly (A12)

Removal and installation of timing circuit assembly (fig. 3-9) is as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4). Remove cover from chassis.

(2) Remove screws (5) holding retainer (6) to chassis. Remove retainer.

(3) Carefully pull timing circuit assembly from connector.

b. Installation.

(1) Push replacement timing circuit assembly into connector.

(2) Perform an operational check of battery charger in accordance with section V.

(3) Install retainer on chassis and fasten with screws.

(4) Install cover on chassis and fasten with screws and washers.

3-17. Display Circuit Assembly (A13)

Removal and installation of display circuit assembly or individual display modules in the assembly (fig. 3-10) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4). Remove cover from chassis.

(2) Remove screws (5) and washers (6 and 7) holding display circuit assembly (11) to chassis.

NOTE

If an individual module is to be replaced, go to paragraph (3). If the complete display circuit assembly is to be replaced, go to paragraph (5).

(3) Carefully move display circuit assembly away from chassis to gain access to individual display modules U1, U2, and U3 (12, view A).

(4) Carefully pull defective module from display circuit assembly. Go to paragraph *b* (1).

(5) Carefully move display circuit assembly away from chassis and disconnect connector P1 from J1.

(6) Remove screws (8), washers (9 and 10) and standoffs (13) from assembly. Go to paragraph *b* (3).

b. Installation.

(1) Push replacement display module (U1, U2 or U3) in display circuit assembly (11).

(2) Position display assembly on chassis (4) and fasten with screws (5) and washers (6 and 7). Go to paragraph (6).

(3) Position each standoff (13) on display circuit assembly (11). Fasten with screws (8) and washers (9 and 10).

(4) Connect connector P1 to J1 on display assembly.

(5) Position display assembly on chassis and fasten with screws (5) and washers (6 and 7).

(6) Perform an operational check of battery charger in accordance with section V.

(7) Install cover (3) on chassis and fasten with screws (1) and washers (2).

3-18. Power Cable (W1)

Removal and installation of power cable (fig. 3-11) is as follows:

a. Removal.

Remove screws (1) and washers (2) holding cover (3) to chassis (4). Remove cover from chassis.

(2) Remove screws (5) and nuts (6) holding bracket (7) to chassis.

(3) Remove nuts (8) holding filters (9) to bracket. Let nuts rest on top of filters.

(4) Carefully move bracket away from chassis to gain access to filters.

(5) Tag and unsolder lead of power cable (10) from filters and grounding terminal (13).

(6) Pull power cable and strain relief (11) from chassis.

b. Installation.

(1) Route leads of replacement power cable (10) through hole in chassis. Be sure that groove in strain relief (11) firmly mates with hole.

(2) Install 115/230 VAC bands (12) over black and white leads of power cable.

(3) Install heat shrinkable insulation sleeving (M23053/5-105-2 per MIL-I-23053) over black and white leads of power cable.

(4) Using tagged leads of removed power cable as a guide, solder black and white leads of replacement power cable to filters (9).

(5) Slide heat shrinkable insulation sleeving over soldered connections.

(6) Using heat gun, heat shrink sleeving on soldered connections.

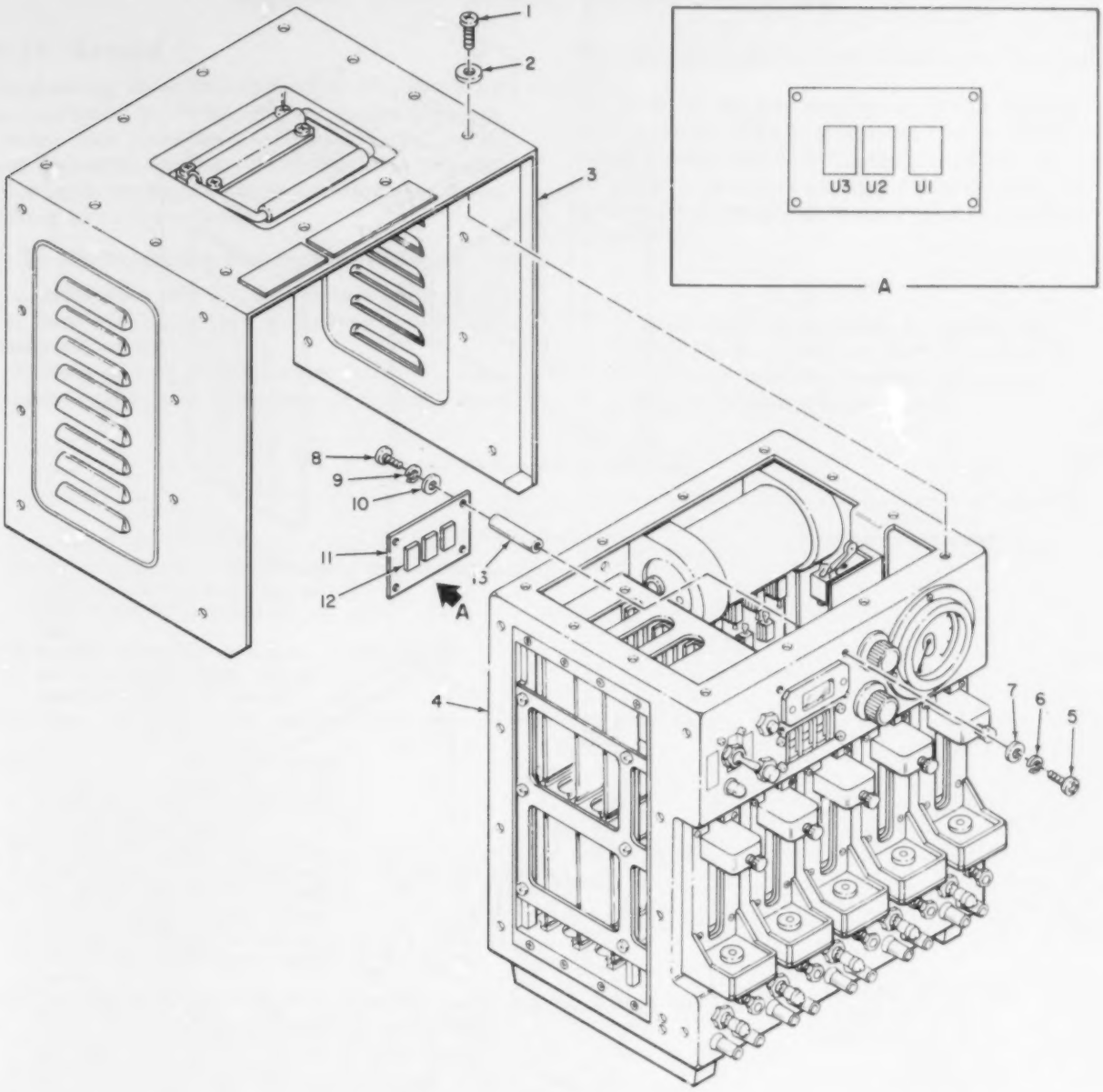
(7) Solder green lead of power cable to ground terminal (13).

(8) Position filters in mounting holes of bracket (7) and fasten with nuts (8).

(9) Position bracket on chassis and fasten with screws (5) and nuts (6).

(10) Perform an operational check of battery charger in accordance with section V.

(11) Install cover (3) on chassis (4) and fasten with screws (1) and washers (2).



LEGEND FOR FIGURE 3-10:

1. SCREW (28)
2. WASHER (28)
3. COVER
4. CHASSIS
5. SCREW (4)
6. WASHER (4)
7. WASHER (4)
8. SCREW (4)
9. WASHER (4)
10. WASHER (4)
11. DISPLAY CIRCUIT ASSEMBLY (A13)
12. DISPLAY MODULES (U1, U2, AND U3)
13. STANDOFF (4)

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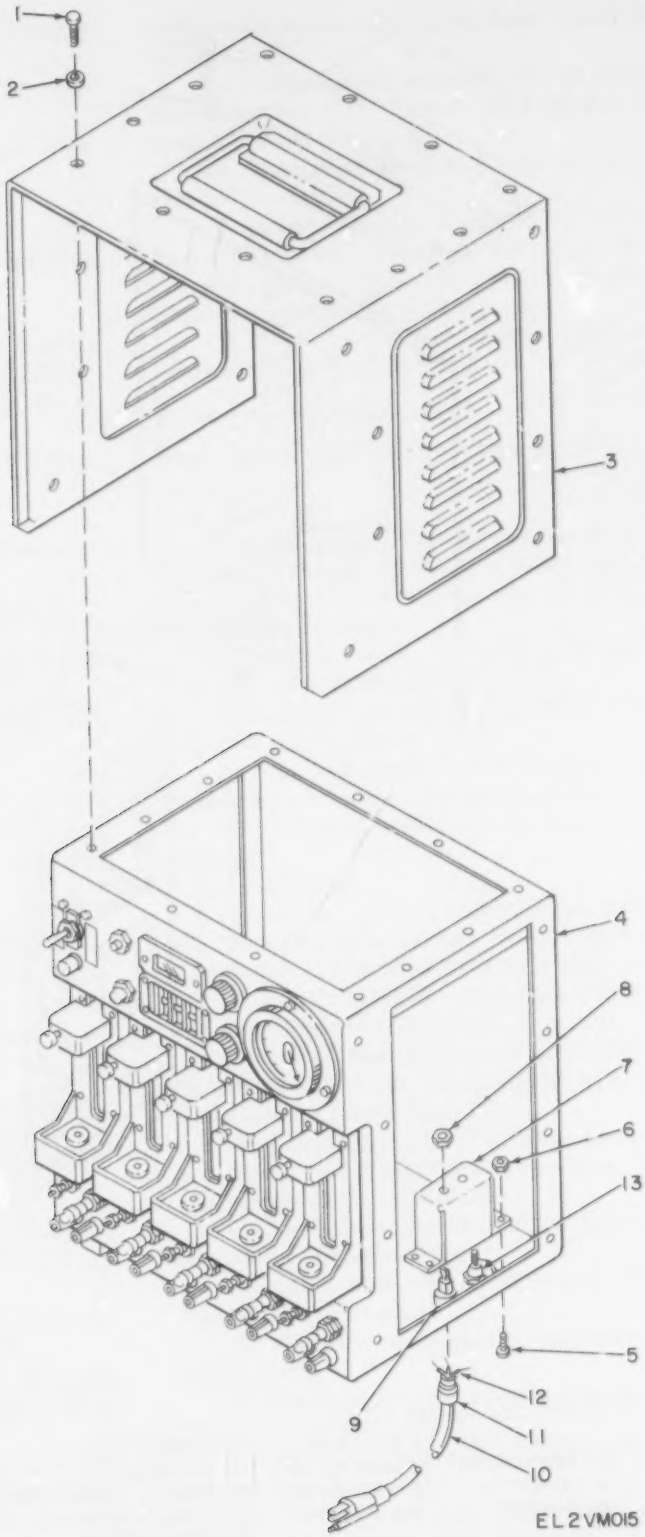
Figure 3-10. Display Circuit Assembly (A13) Removal and Installation.



LEGEND FOR FIG. 3-11:

1. SCREW (28)
2. WASHER (28)
3. COVER
4. CHASSIS
5. SCREW (2)
6. NUT (2)
7. BRACKET (EMI)
8. NUT (2)
9. FILTERS (FL1 AND FL2)
10. POWER CABLE (W1)
11. STRAIN RELIEF
12. 115/230 VAC BAND
13. GROUND TERMINAL (E1)

Figure 3-11. Power Cable Removal and Installation

Section V. DIRECT SUPPORT TESTING PROCEDURE

3-19. General

Final testing of the Battery Charger PP-7286/U will be performed by direct support maintenance personnel. Test procedures contained in this section will determine whether the performance of equipment, with components tested and replaced, is satisfactory for return to users.

3-20. Performance Testing Procedure

a. Make sure that battery charger maintenance has been completed, and equipment is ready for final performance testing.

b. Make sure all controls are set accurately, when performing final test procedures. If in doubt about the result obtained in any test step; repeat the test step.

c. Perform the test procedures in the sequence listed in table 3-5. To be acceptable, battery charger must pass each test before being returned to users. If a malfunction occurs during performance testing; perform troubleshooting test procedure as outlined in section III.

CAUTION

If meter needle pegs during any portion of following test, quickly set POWER switch to OFF and perform troubleshooting test procedure as outlined in section III.

Table 3-5. Performance Test Procedures

Column 1 Test Procedure	Column 2 Acceptable Test Result	Column 3 Reference, or Instruction
(1) With power cable connected and battery charger prepared per para 3-10, set POWER switch to ON position.	POWER ON lamp lights.	
(2) Set CHANNEL SELECT switch to 1. Set VOLTAGE TEST SELECT switch to B1. Check panel meter.	No reading.	
(3) Press VOLTAGE TEST switch. Check Panel Meter reading.	Panel meter reads more than 700 mA. Display is 18.8.	
(4) Turn SET CHARGE TIME thumbwheels to 18.8. Press START TIME switch. Check CHARGE TIME HOURS REMAINING		
(5) Set CHANNEL SELECT switch to 1, all CURRENT SET switches to 50 mA and all FINE ADJ controls fully counterclockwise. Rotate CHANNEL SELECT switch to each of 5 positions in turn. Check current reading.	Reading is less than 15 mA (on 50 mA scale), each of 5 channels.	
(6) Set CHANNEL SELECT switch to 1. Adjust channel 1 FINE ADJ control for panel meter reading of 50 mA. Repeat for channels 2, 3, 4 and 5.	All channels can be adjusted for 50 mA meter reading.	
(7) Repeat steps (5) and (6) with CURRENT SET switches in 200 mA position.	*a.* Reading is less than or equal to 50 mA (on 200 mA scale), each of 5 channels. *b.* All channels can be adjusted to 200 mA meter reading.	
(8) Repeat steps (5) and (6) with CURRENT SET switches in 700 mA position.	*a.* Reading is less than or equal to 200 mA (on 700 mA scale), each of 5 channels. *b.* All channels can be adjusted to 700 mA meter reading.	
(9) Set all CURRENT SET switches to 50 mA and get stopwatch. Press START TIME switch. Record exact time taken by CHARGE TIME HOURS REMAINING display to change from 18.8 to 18.7. (Do not wait more than 7 minutes for change.) Limits are: Low—5 minutes, 42 seconds High—6 minutes, 18 seconds.	Display changed from 18.8 to 18.7 within limits.	

Table 3-5. Performance Test Procedures – Continued

Column 1 Test Procedure	Column 2 Acceptable Test Result	Column 3 Reference, or Instruction
(10) Set CHARGE TIME HOURS REMAINING to read 00.0. Press START TIME switch. Check display.	Display reads .0 when START TIME is pressed; goes blank when START TIME is released.	
(11) Check panel meter.	No current flow.	
(12) Set CHARGE TIME HOURS REMAINING to read 09.9. Press START TIME switch. Check display.	Display is 9.9.	
(13) Set CHARGE TIME HOURS REMAINING to read 00.9. Press START TIME switch. Check display.	Display is .9.	
(14) Repeat, as in (13), with settings at: 17.7 16.6 15.5 14.4 13.3 12.2 11.1 10.0 For each, check display.	Display is same, for each of the 8 different settings.	
(15) Set CHARGE TIME HOURS REMAINING to read 18.8. Press START TIME switch. Remove power cable from 115 VAC input source. Use stopwatch; time 10 seconds and reconnect power cable. Check display.	Display did not change; reads 18.8.	
(16) If performance tests are now completed, turn POWER switch to OFF. Remove power cable from 115 VAC source. Remove band from interlock switch and remove clip leads from REMOTE BATTERY jacks. Assemble retainer and cover and set controls per para 3-10e. Refer to figure 3-1.	All tests were passed	Go to step (17) table 3-4.
(17) Connect power cable to 115 VAC. Set POWER switch to ON. POWER ON lamp should light.	POWER ON lamp lights.	
(18) Set POWER OFF, disconnect power cable, return battery charger to service.		

Section VI. MAINTENANCE OF BATTERY CHARGING TRAY ASSEMBLY

3-21. General

Repair of battery charging tray assembly at direct support level is limited to replacement of items listed in paragraph 3-3.

WARNING

Disconnect cable assembly (7, fig. 2-1.1) from battery charger before performing any maintenance on the battery charging tray assembly.

3-22. Connector

Removal and installation of any connector (1, fig. 2-1.1) is as follows:

a. Note and record the connector terminals from which the wiring is to be removed, then unsolder the wiring from rear of socket.

b. Unscrew the hex nut from rear of defective connector and remove connector and terminal washer.

c. Installation procedures are essentially the reverse of removal procedures (fig. 3-12).

3-23. Switch

Removal and installation of any switch (2, fig. 2-1.1) is as follows:

a. Note and record the switch terminals from which the wiring is to be removed, then unsolder the wiring from rear of switch.

b. Unscrew the hex nut from rear of switch and remove switch.

c. Installation procedures are essentially the reverse of removal procedures (fig. 3-12).

3-24. Banana Plugs

Removal and installation of either banana plug (4 and 5, fig. 2-1.1) is as follows:

a. Remove insulation sleeving (6, fig. 2-1.1).

b. Unscrew shell from plug and unsolder wire.

c. Slip new insulation sleeving over wire and resolder wire to replacement plug.

d. Screw shell onto plug.

e. Slide insulation sleeving over shell and shrink into place with heat gun.

3-25. Cable Assembly

Removal and installation of cable assembly (7, fig. 2-1.1) is as follows:

a. Unsolder white wire from E1 (fig. 3-12) and black wire from terminal 3 of SW1 (fig. 3-12).

b. Pull the two wires of cable assembly from cable bushing (8, fig. 2-1.1).

c. Insert the two wires of replacement cable assembly through the two holes in cable bushing.

d. Solder black wire to terminal 3 of SW1 and white wire to E1 (fig. 3-12).

3-26. Cable Bushing

Removal and installation of cable bushing (8, fig. 2-1.1) is as follows:

a. Remove cable assembly (refer to para 3-25).

b. Using an arbor press, press cable bushing from battery holder (11, fig. 2-1.1).

c. Using an arbor press, press replacement cable bushing into battery holder.

d. Install cable assembly (refer to para 3-25).

3-27. Threaded Insert

Removal and installation of threaded insert (10, fig. 2-1.1) is as follows:

a. Turn cover (3, fig. 2-1.1) upside down and, using an arbor press, press threaded insert from cover.

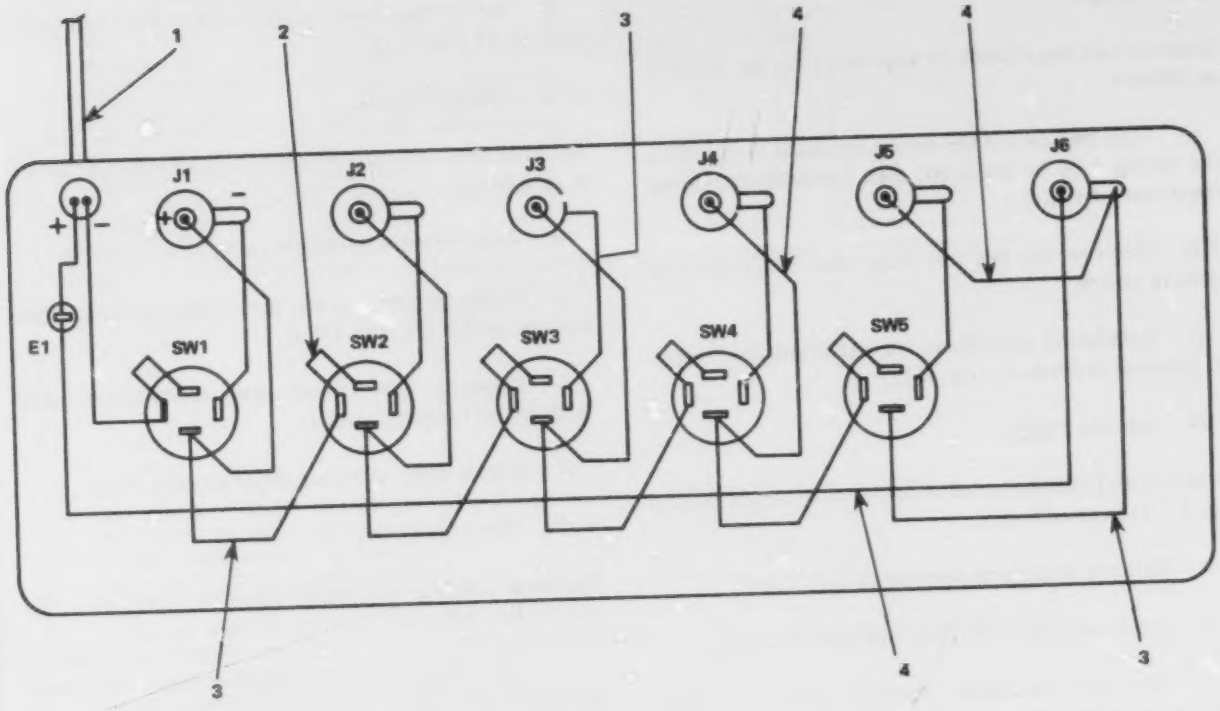
b. Turn cover rightside up and, using an arbor press, press replacement threaded insert into cover.

3-28. Electrical Wire

Removal and installation of electrical wire is as follows:

a. Unsolder the defective wire from its connecting terminals.

b. Solder the replacement wire to its proper terminals (fig. 3-12).



LEGEND FOR FIGURE 3-12.

1. CABLE ASSEMBLY
2. WIRE, SOLID
3. WIRE, STRANDED (BLK)
4. WIRE, STRANDED (RED)

Figure 3-12. Battery Charging Tray Assembly Wiring Diagram.

CHAPTER 4

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

4-1. Scope

This chapter contains instructions for fault isolation testing, component replacement procedures, limited repairs or calibration, and testing of equipment after component replacement or repair for general support (GS) maintenance of Battery Charger PP-7286/U. Illustrations are provided, and tools, equipment, or materials are specified for battery charger GS maintenance. General support maintenance personnel will perform tests and replacements, and repair of limited components. Repair of printed wiring/board assemblies will be performed by depot level maintenance personnel only.

4-2. General Support Tests

General support personnel will perform tests, as follows:

a. Make voltage, resistance, and waveform measurements to isolate faulty printed wiring/board assemblies and related battery charger components.

b. Test battery charger performance, after replacement or repair of faulty components.

4-3. General Support Replacements and Repairs (figure 4-1)

General support (GS) personnel are authorized to replace the following:

a. Related Battery Charger PP-7286/U components:

(1) Battery holders
(2) Filter capacitor (C1)
(3) Transformer (T1)
(4) Power switch (CB1)
(5) Interlock switch (S6)
(6) Input voltage switch (S1)
(7) Resistor assembly (A14) components
(8) EMI filters (FL1 and FL2)
(9) Panel meter (M1)
(10) All other front panel components (switches S2 through S5, S7 through S12, jacks, and fine adjust controls R5 through R9)
(11) Terminal board (TB1) components

b. Printed wiring/board assemblies, power cable, memory battery, lamp, and fuses. Refer to Chapter 3, direct support maintenance instructions.

c. GS personnel will also adjust panel meter (M1).

4-4. Repainting and Refinishing Instructions

Refer to Chapter 3, for authorized touchup of small damaged areas.

4-5. Voltage, Resistance, and Waveform Measurements

Fault isolation procedures are specified in paragraph 4-12, by test number and description. Procedures specify when voltage, resistance, and waveform measurements are to be made, and test points to be used. Illustrations are provided or referenced for identity and test point locations.

Section II. TOOLS AND EQUIPMENT

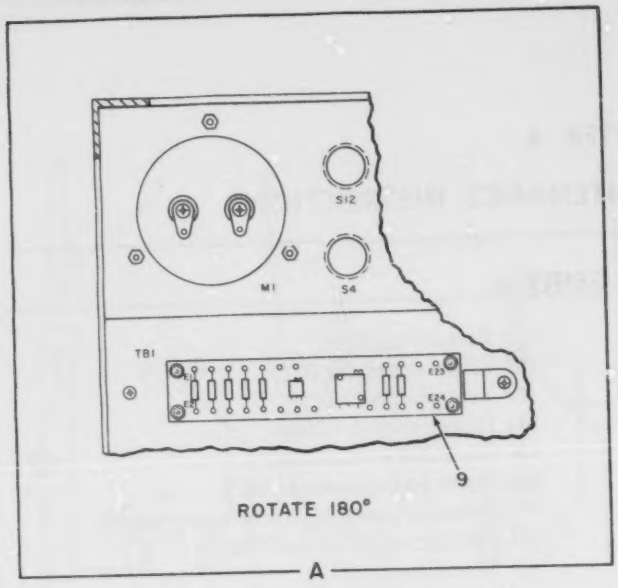
4-6. Test Equipment, Tools and Materials

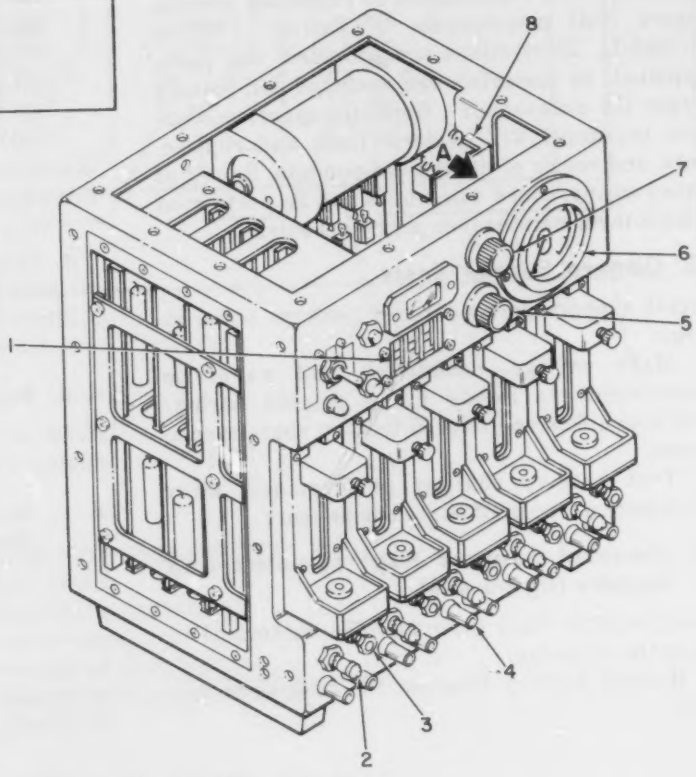
a. Test equipment. Test equipment required for general support maintenance of Battery Charger PP-7286/U is listed in table 4-1.

b. Tools and Materials. Tools and materials required for general support maintenance, including special tools required for fault isolation, are listed in table 4-2.

Table 4-1. Test Equipment

Item	Technical Manual	Common Name	National Stock No.
Multimeter, digital HP 3465B, or equiv			
Oscilloscope, AN/USM-281	TM 11-6625-1703-15	Digital Multimeter Oscilloscope	6625-00-053-3112
Stopwatch			6645-00-903-1696





LEGEND FOR FIGURE 4-1:
1. SET TIME CHARGE CONTROL (S3)
2. CURRENT SET SWITCHES (S7-S11)
3. CURRENT SET FINE ADJ CONTROLS (R5-R9)
4. REMOTE BATTERY JACKS
5. CHANNEL SELECT SWITCH (S4)
6. PANEL METER (M1)
7. VOLTAGE TEST SELECT SWITCH (S12)
8. INTERLOCK SWITCH (S6)
9. TERMINAL BOARD (TB1)

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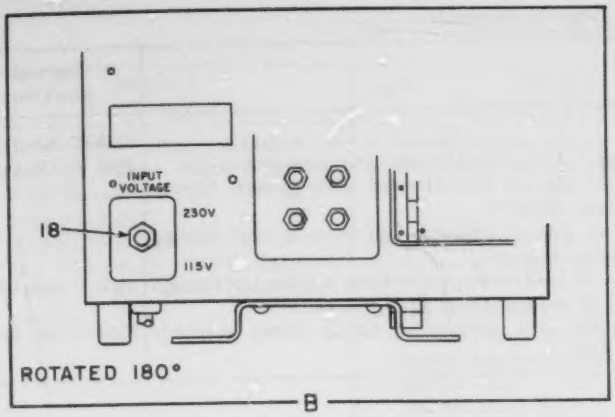
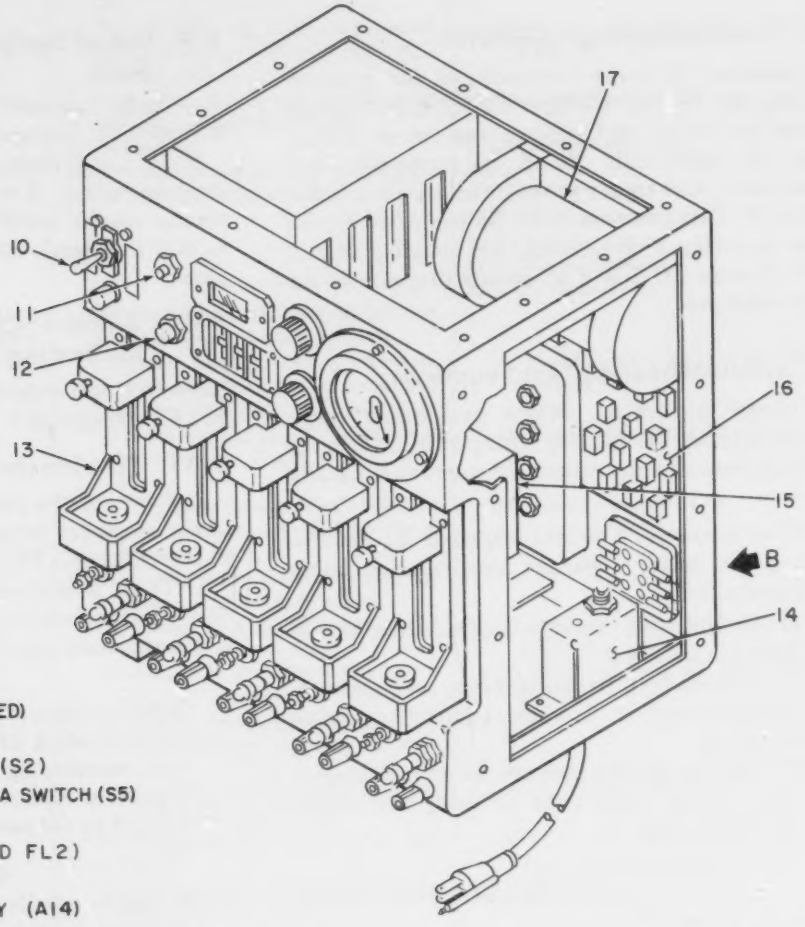
Figure 4-1. Location of Components Replaced at GS (Sheet 1 of 2)





LEGEND FOR FIG. 4-1: (CONTINUED)

10. POWER SWITCH (CB1)
11. START TIME SWITCH (S2)
12. VOLTAGE TEST-CHG MA SWITCH (S5)
13. BATTERY HOLDERS
14. EMI FILTERS (FL1 AND FL2)
15. TRANSFORMER (T1)
16. RESISTOR ASSEMBLY (A14)
17. FILTER CAPACITOR (C1)
18. INPUT VOLTAGE SWITCH (S1)

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Figure 4-1. Location of Components Replaced GS (Sheet 2 of 2)

Table 4-2. Tools and Materials

Item	Use	National Stock No.
Tool kit, Electronic Equipment TK-105/G		5180-00-610-8177
Heat Gun	Heat shrink sleeving installed over some connections	4940-00-785-1162
Staking compound, blue SM-B-739574	Cover exposed terminals and allow to cure. (Curing time—24 hours)	
Staking compound, red SM-A-852514	Cover exposed terminals and allow to cure. (Curing time—24 hours)	
Extender board, testing (23 pin) SM-D-889125	Special, fault isolation of charging modules (A6 through A10) and power supply assembly (A11)	6130-01-066-4496
Extender board, testing (41 pin) SM-D-889122	Special, fault isolation of timing circuit assembly (A12)	6130-01-066-4495

Section III. TROUBLESHOOTING

4-7. Troubleshooting—General

This section contains instructions for troubleshooting the Battery Charger PP-7286/U. General support personnel will replace and repair components, as specifically listed in paragraph 4-3. Replacement and repair procedures are included in Section IV. Test procedures for GS use, after replacing or repairing a component, are included in Section V. Figure FO-1 is a schematic diagram of the battery charger.

4-8. Troubleshooting Test Sequence

a. Visual inspection. Before performing tests, visually inspect the battery charger to find faults that experienced and trained GS personnel usually find.

b. Test sequence. The test sequence for troubleshooting the battery charger and isolating faulty components, is:

(1) Perform the troubleshooting test procedures listed in table 4-3.

(2) Perform fault isolation test procedures contained in paragraph 4-12, when required by a table 4-3 instruction.

(3) Test the battery charger, after replacing or repairing a faulty component, by using test procedure listed in Section V.

c. Test point locations.

(1) Refer to direct support maintenance Chapter 3, section III.

(2) Additional illustrations are provided and referenced in text.

4-9. Use of Equipment and Special Tools

a. Refer to direct support maintenance, Chapter 3, section III, paragraph 3-9.

b. In use of digital multimeter, and reference to settings in text, F = Function, R = Range. For continuity checks, set Function to Ω (ohms) and Range to 200 Ω (ohms). Reading should be less than 0.2 ohms.

4-10. Battery Charger, Preparation for Testing

Refer to direct support maintenance, Chapter 3, section III, paragraph 3-10.

4-11. Troubleshooting Test Procedure

a. Perform test procedures as shown in table 4-3, in the sequence listed in column 1 to troubleshoot Battery Charger PP-7286/U.

b. From a malfunction indication in column 2, follow instruction or reference in column 3 to isolate faults and make required corrections.

NOTE

When a column 3 instruction in table 4-3 requires finding and correcting an open circuit; resoldering or replacing a wire lead is a general repair authorized and to be performed by GS personnel.

CAUTION

If meter needle pegs during any step of following table, quickly set POWER switch to OFF and perform instruction in column 3 of step (4).

Table 4-3. Troubleshooting Test Procedures

Column 1 Test Procedure	Column 2 Malfunction Indication	Column 3 Reference or Instruction
(1) With power cable connected to battery charger (para 3-10), set POWER switch to ON. POWER ON lamp should light.	*a.* POWER switch trips off	*a.* Go to Test 1, para 4-12
	b. POWER ON lamp does not light	*b.* Go to Test 2, para 4-12
(2) Set CHANNEL SELECT switch to 1. Set VOLTAGE TEST SELECT switch to B1. Check panel meter reading.	Indicates a current flow.	
	a. Voltage at S3-TP1 (fig. 3-3) is less than 0.5 VDC.	*a.* Replace CB1
	b. The 10V Pulse (fig. 3-5) is present at A11-TP4 every time POWER switch is turned on and voltage at TB1-E8 is less tahn 1.0 VDC.	*b.* Replace S5
	c. The 10V Pulse (fig. 3-5) is not present at A11-TP4 but is present at A12 pin 32 every time POWER switch is turned ON.	*c.* Find open between XA12-32 and XA11-10
	d. The 10V Pulse (fig. 3-5) is not present at A12 pin 32 and voltage at A12-TP2 is less than 7 VDC.	*d.* Find open between XA11-16 and XA12-41
(3) Press VOLTAGE TEST switch. Check panel meter reading.	*a.* Less than 700 mA and voltage at TB1-E7 is greater than 7 VDC.	*a.* Go to Test 3, para 4-12.
	b. No reading.	*b* Go to Test 4, para 4-12.
(4) Turn SET CHARGE TIME thumbwheels to 10.0. Press START TIME switch. Turn CHANNEL SELECT switch through all 5 positions and observe panel meter.	Meter needle pegs at one or more positions of CHANNEL SELECT switch.	Replace R5 if CH.1 pegs meter R6 if CH.2 pegs meter R7 if CH.3 pegs meter R8 if CH.4 pegs meter R9 if CH.5 pegs meter
(5) Turn SET CHARGE TIME thumbwheels to 18.8. Press START TIME switch. Check CHARGE TIME HOURS REMAINING.	*a.* No display digits are blank but at least one digit is reading incorrectly.	
	(1) Don't have continuity between every pin of fault display socket and appropriate pin on A12 (table 3-4).	(1) Find faulty P1, XA12, A13 or faulty wiring of P1.
	(2) Voltage is less than 9 VDC on any of following pins of A12: Pins 1, 27 or 28.	(2) Go to Test 5, para 4-12.
	(3) Voltage is greater than 1 VDC on any of following pins of A12: Pins 2, 3, 4, 13, 22, or 26.	(3) Go to Test 5, para 4-12.
	b. All display digits are blank and panel meter is reading a current flow.	
	(1) Voltage at A12-TP2 is less than 7 VDC.	(1) Find open between XA11-16 and XA12-41
	(2) Voltage at TB1-E19 is less than 7 VDC.	(2) Find open between XA12-39 and S3C-C
	c. All display digits are blank, there is no indication on the panel meter and F6 is good.	
	(1) AC voltage between pins 22 and 23 of A11 is less than 7 VAC.	(1) Go to Test 6, para 4-12
	(2) Voltage at pin 41 of A12 is less than 7 VDC.	(2) Find open between XA11-16 and XA12-41
	(3) Voltage at pin 41 of A12 is greater than 7 VDC.	(3) Replace S2
	d. All display digits are blank, there is no indication on panel meter and F6 is bad.	
	(1) With POWER switch OFF, resistance between XA11-14 and C1 (−) is less than 20Ω.	(1) Find low resistance to ground at XA11-14, XA11-16, XA12-40, or XA12-41
	(2) Resistance between XA11-14 and C1(−) is greater than 20Ω.	(2) Find low resistance to ground at XA11-18, XA6-22, XA7-22, XA8-22, XA9-22 or XA10-22

Table 4-3. Troubleshooting Test Procedures—Continued

Column 1 Test Procedure	Column 2 Malfunction Indication	Column 3 Reference or Instruction
(6) Set CHANNEL SELECT to 1. Adjust channel 1 CURRENT SET and FINE ADJ for panel meter reading of 50 mA. Repeat for channels 2, 3, 4 and 5. Check panel meter reading.	*a.* No channel can be adjusted for 50 mA. but all channels have a reading of greater than 2 mA.	*a.* Go to Test 7, para 4-12
	b. At least one channel can be adjusted for 50 mA and all channels have a reading of greater than 2 mA.	*b.* Replace R5 if CH 1 is bad R6 if CH 2 is bad R7 if CH 3 is bad R8 if CH 4 is bad R9 if CH 5 is bad
	c. At least one but not all channels have a reading of less than 2 mA and voltage at A11-TP7 is >100 VDC.	*c.* Replace T1, charging board(s) of bad channel(s) and fuse(s) of bad channel(s)
	d. At least one but not all channels has a reading of less than 2 mA and voltage at A11-TP7 is ≤100 VDC.	*d.* Send to depot for repair
	e. All channels have a reading of less than 2 mA. (1) Voltage at A6-TP2 is greater than 100 VDC.	(1) Replace T1, A6-A10 and F1-F5.
	(2) Voltage at A6-TP2 is less than 20 VDC.	(2) Go to Test 8, para 4-12
	(3) Voltage at A6-TP4 is greater than 7 VDC and fuses F1 through F5 are bad.	(3) Go to Test 9 para 4-12
	(4) Voltage at A6-TP4 is greater than 7 VDC and fuses F1 through F5 are good.	(4) Go to Test 10, para 4-12
	(5) Voltage at A6-TP4 is less than 7 VDC and voltage at A11-TP2 is greater than 7 VDC.	(5) Find open between XA10-22 and XA11-18
	(6) Voltage at A6-TP4 is less than 7 VDC and voltage at A11-TP2 is less than 7 VDC.	(6) Find open between XA11-6 and XA12-31
(7) Set all CURRENT SET switches to 200 mA position. Set all FINE ADJ controls fully counterclockwise. Rotate CHANNEL SELECT to each of 5 channels. Check current reading; to be less than or equal to 50 mA each of 5 channels.	*a.* Each channel shows more than 50 mA reading.	*a.* Go to Test 11, para 4-12
	b. At least one channel, but not all, reads more than 50 mA.	*b.* Replace R5 if CH 1 50 mA R6 if CH 2 50 mA R7 if CH 3 50 mA R8 if CH 4 50 mA R9 if CH 5 50 mA
(8) Set all CURRENT SET switches to 700 mA position. Repeat same procedure as in (6).	*a.* No channel has an indication of less than 200 mA.	*a.* Go to Test 12, para 4-12
	b. At least one but not all channels has an indication of less than 200 mA.	*b.* Go to Test 13, para 4-12
(9) Set all CURRENT SET and FINE ADJ controls for panel meter reading of 700 mA. Rotate CHANNEL SELECT to each of 5 channels. Check current reading; to be 700 mA.	No channel has a meter reading of 700 mA.	Replace TB1-R10
(10) Set CHARGE TIME HOURS REMAINING to read 18.8. Press START TIME switch. Remove power cable from 115 VAC input source. Use stopwatch; time 10 seconds and reconnect power cable. Check display; to be unchanged.	Display not 18.8.	Find open between XA12-33 and CB1-NO

Table 4-3. Troubleshooting Test Procedures—Continued

Column 1 Test Procedure	Column 2 Malfunction Indication	Column 3 Reference or Instruction
(11) If troubleshooting tests are now completed, turn POWER switch to OFF. Remove power cable from 115 VAC source. Remove band from interlock switch and remove clip leads from REMOTE BATTERY jacks. Assemble retainer and cover and set controls per para 3-10e. Refer to figure 3-1.	None.	
(12) Connect power cable to 115 VAC. Set POWER switch to ON. POWER ON lamp should light.	None; lamp lights.	Go to section V for performance testing

4-12. Fault Isolation Tests

Tests, for use by general support (GS) maintenance personnel, are included or referenced for components authorized for test, replacement, or repair at GS level.

a. Refer to tests, used at direct support level, in Chapter 3, paragraph 3-12.

b. Numbered tests, specifically added for use at GS level, are as follows:

Test 1. Power Supply Assembly (A11) Short Circuit Test 2.

a. Peel or pick away red staking compound on positive (+) terminal of filter capacitor C1 (fig. 4-1) and disconnect leads from terminal.

b. Set POWER switch ON.

(1) If POWER switch remains ON, replace C1 (Section IV, para 4-17). Go to section V.

(2) If POWER switch trips OFF, connect leads to C1 and apply a coating of red staking compound (SM-A-852514) over connection. Disconnect transformer lead T1-6 (fig. 4-1) on transformer.

c. Set POWER switch ON.

(1) If POWER switch remains ON, set POWER switch OFF and replace A14-CR1 (Section IV, para 4-22). Go to section V.

(2) If POWER switch trips OFF, reconnect lead to T1-6. Peel or pick away red staking compound on T1 and disconnect leads from T1-2 and T1-3 (fig. 4-1).

d. Set POWER switch ON.

(1) If POWER switch remains ON, set POWER switch OFF. Replace T1 (Section IV, para 4-18). Go to section V.

(2) If POWER switch trips OFF, disconnect leads from T1-1 and T1-5.

e. Set POWER to ON.

(1) If POWER switch stays ON; set POWER to OFF, reconnect wires to T1-1, T1-2, T1-3, and T1-5. Apply a 0.04-0.08 inch coat of red staking compound (SM-A-852314) over T1 terminals 1 through 5. Replace S1 (Section IV, para 4-21). Go to section V.

(2) If POWER switch trips OFF; reconnect wires to T1-1, T1-2, T1-3, and T1-5. Apply a 0.04-0.08 inch coat of red staking compound (SM-A-852314) over T1 terminals 1 through 5. Replace CB1 (Section IV, para 4-19). Go to section V.

Test 2. Power Input Circuit Test.

a. Set POWER to OFF. Remove power cable from 115 VAC source. Set POWER switch to ON. Measure resistance between two flat blades of power cable plug with multimeter (set F = Ω, R = 200 Ω).

(1) If meter reading is 5 ohms or more; go to step *b*.

(2) If meter reading is less than 5 ohms; set POWER switch to OFF, reconnect power cable to 115 VAC source, and go to step *i*.

b. Peel or pick away red staking compound on T1 (fig. 4-1 and FO-1). Check for continuity between T1-1 and each of two flat blades of power cable plug; check also between T1-5 and same two blades. There should be continuity (less than 0.2 ohms) from T1-1 to one blade, and from T1-5 to other blade.

(1) If continuity is good; go to step *c*.

(2) If continuity not good; go to step *e*.

c. Measure resistance between T1-1 and T1-2, and between T1-3 and T1-5 (F = Ω, R = 200 Ω).

(1) If resistance is less than 5 ohms; go to step *d*.

(2) If resistance is equal to 5 ohms, or is greater; replace T1 (Section IV, para 4-18). Go to section V.

d. Peel or pick away red staking compound on S1 (fig. 4-2 and FO-1). Check for continuity between S1-1 and S1-2, and between S1-4 and S1-5.

(1) If continuity is good; check for faulty wiring between T1-1 and S1-4, T1-2 and S1-2, T1-3 and S1-5, or T1-5 and S1-1. Repair fault; apply a

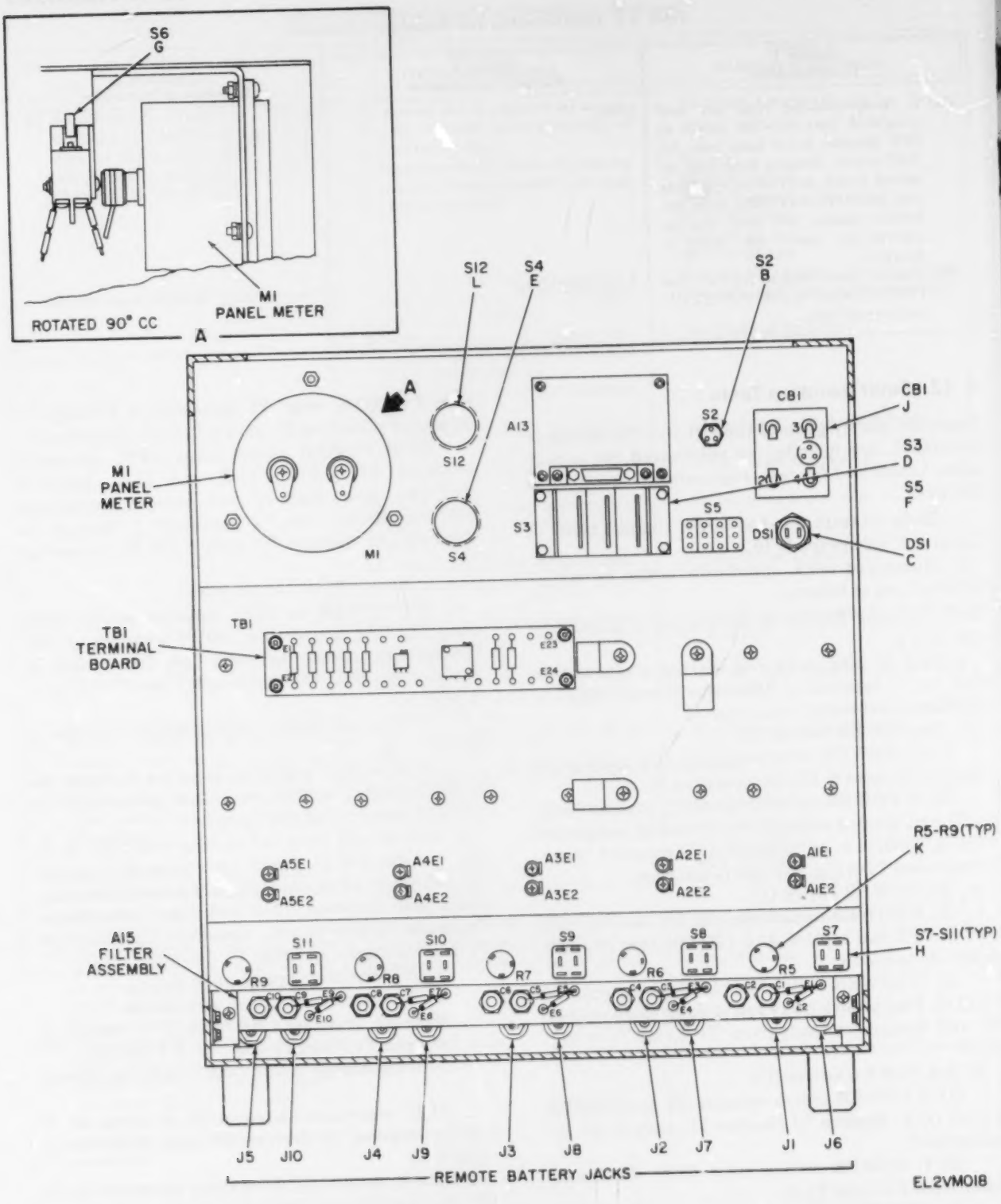


Figure 4-2. Pin and Terminal Locations for Components Replaced at General Support Level (Sheet 1 of 4)

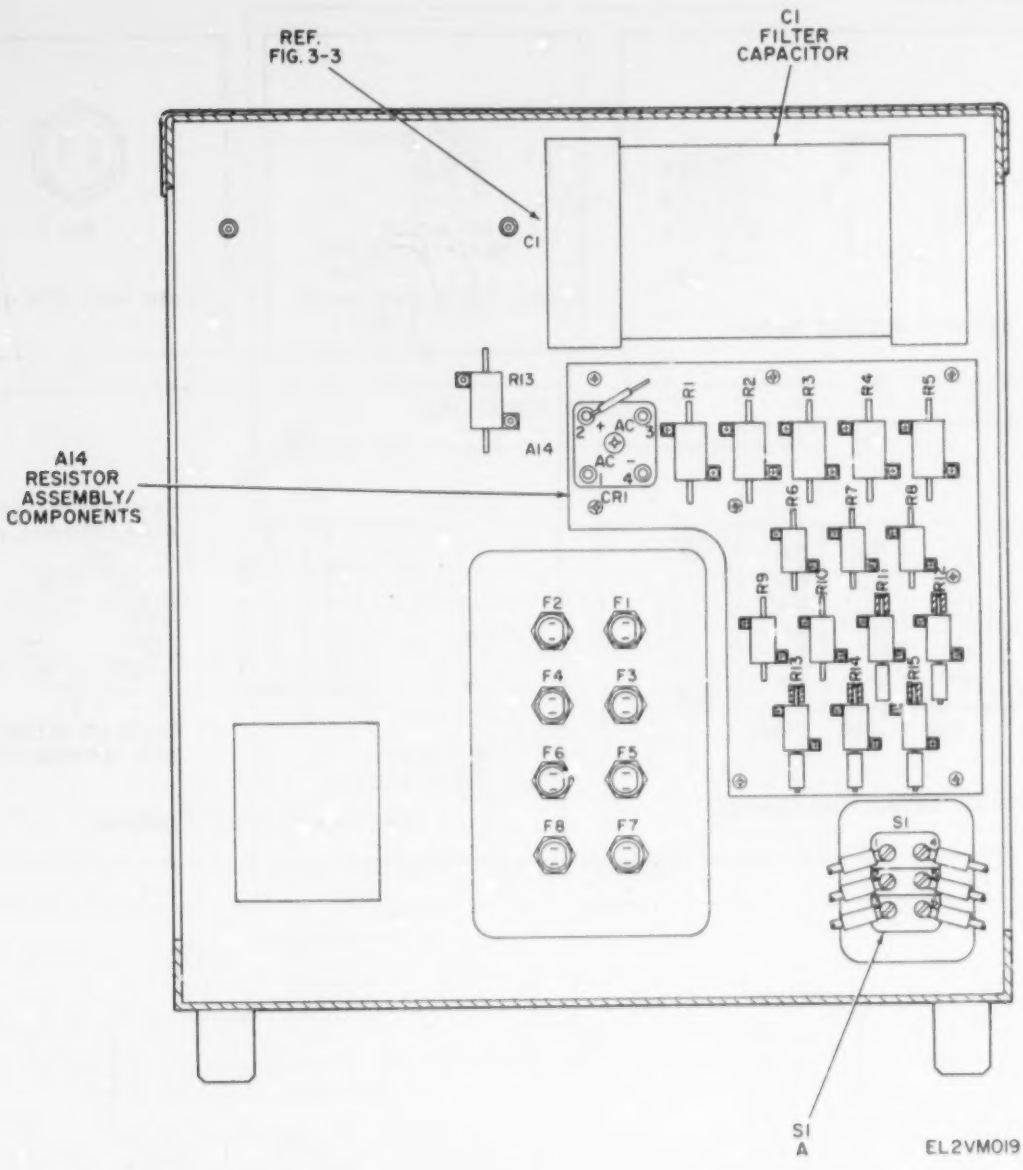


Figure 4-2. Pin and Terminal Locations for Components Replaced at General Support Level (Sheet 2 of 4)

0.04-0.08 inch coating of red staking compound (SM-A-852314) on S1 and on T1 terminals 1 through 5. Go to section V.

(2) If continuity is not good; replace S1 (Section IV, para 4-21), apply a 0.04-0.08 inch coating of red staking compound (SM-A-852314) on T1 terminals 1 through 5. Go to section V.

e. Peel or pick away red staking compound on S6 (fig. 4-2 and FO-1). Check for continuity between S6A-C to S6A-NO and between S6B-C and S6B-NO (only two wires each side of interlock switch). Make sure S6 is actuated (in down and closed position) when measurements are made.

(1) If continuity is good; go to step *f*.

(2) If continuity not good; replace S6 (Section IV, para 4-20).

f. Peel or pick away red staking compound on CB1 (fig. 4-1 and 4-2). Check for continuity between CB1-2 and CB1-1, and between CB1-4 and CB1-3. Make sure POWER switch is in ON position for this measurement.

(1) If continuity is good; go to step *g*.

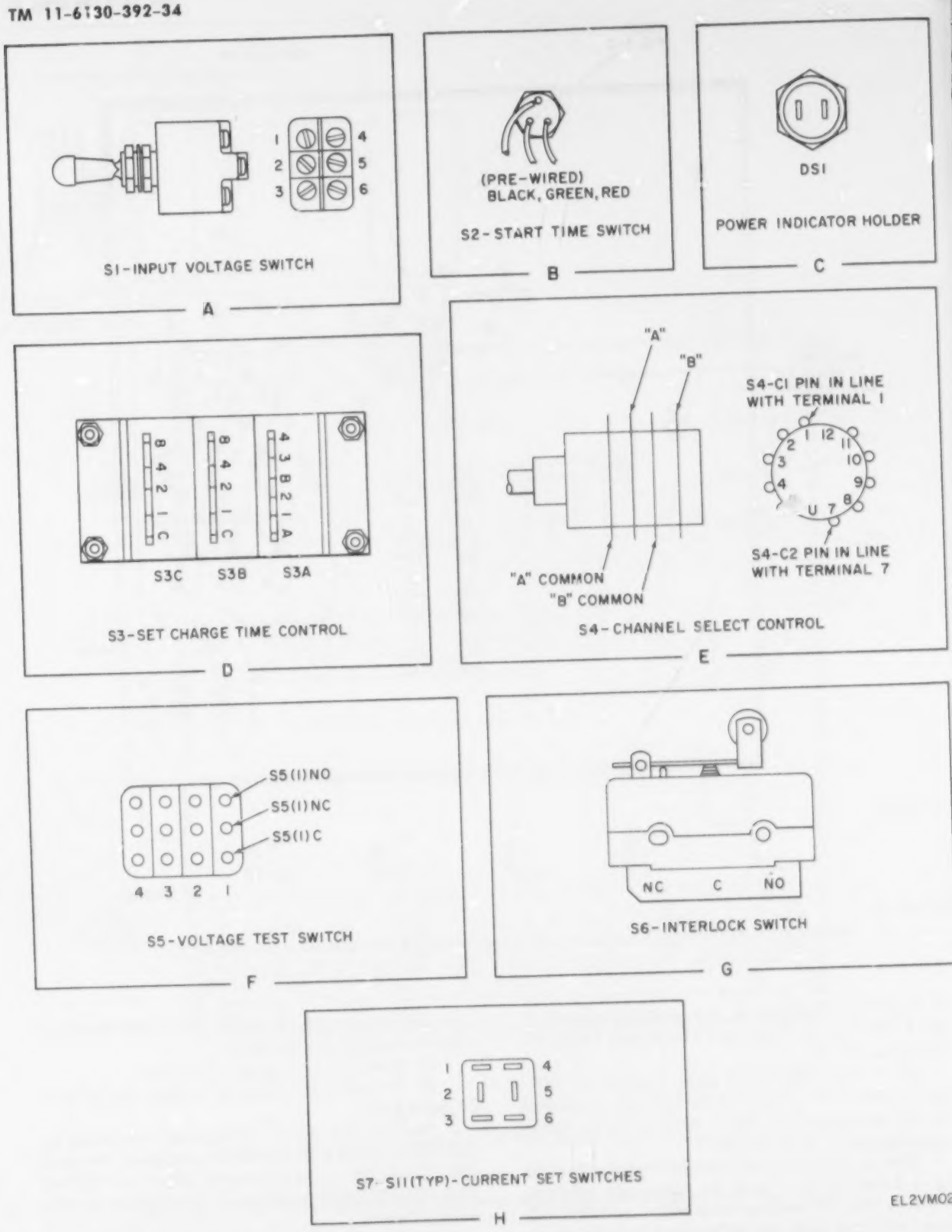
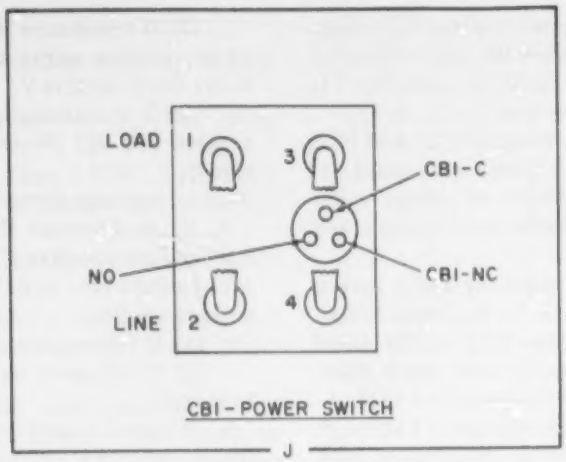
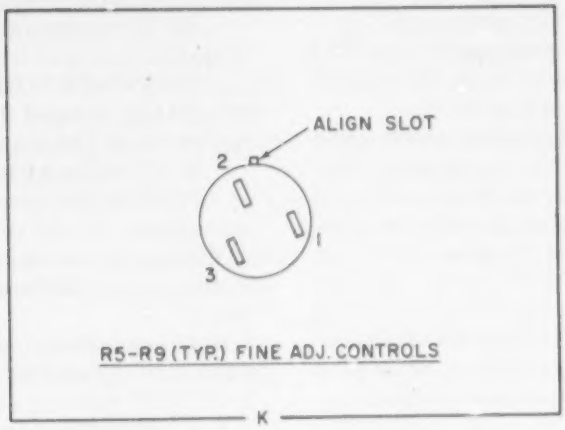


Figure 4-2. Pin and Terminal Locations for Components Replaced at General Support Level (Sheet 3 of 4)





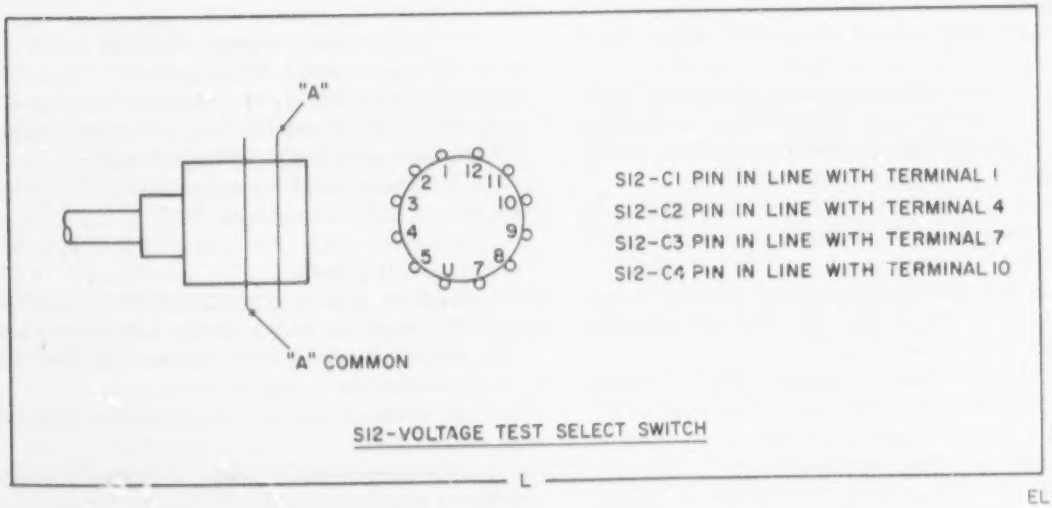

"A"
"A" COMMON
S12-C1 PIN IN LINE WITH TERMINAL 1
S12-C2 PIN IN LINE WITH TERMINAL 4
S12-C3 PIN IN LINE WITH TERMINAL 7
S12-C4 PIN IN LINE WITH TERMINAL 10
S12-VOLTAGE TEST SELECT SWITCH
L
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Figure 4-2. Pin and Terminal Locations for Components Replaced at General Support Level (sheet 4 of 4)

(2) If continuity is not good; replace CB1 (Section IV, para 4-19), apply 0.04-0.08 inch coating of red staking compound (SM-A-852314) on S6, T1, terminals 1 through 5. Go to section V.

g. Peel back red shrink sleeving on FL1 and FL2 terminals (fig. 4-1 and FO-1). Check continuity between each filter and flat blades of power cable plug; should be continuity between FL1 and one blade, FL2 and other blade.

(1) If continuity is good; check for faulty wiring between FL1 and S6A-C (fig. 4-2), FL2 and S6B-C, S6A-NO and CB1-2, S6B-NO and CB1-4, CB1-1 and T1-1, or CB1-3 and T1-5. Repair fault; apply 0.04-0.08 inch coating of red staking compound (SM-A-852314) on S6 and CB1, and T1, terminals 1 through 5, and replace heat shrink sleeving (Section IV, para 4-23) on FL1 and FL2 terminal leads. Go to section V.

(2) If continuity is not good; go to step *h*.

h. Peel back red shrink sleeving on FL1 and FL2 and disassemble to gain access to filters (fig. 4-3 and para. 4-23). Check continuity of each filter.

(1) If continuity is good; replace power cable (para 3-18), apply 0.04-0.08 inch coating of red staking compound (SM-A-852314) on S6 and CB1 and T1, terminals 1 through 5, replace heat shrink sleeving on FL1 and FL2 (Section IV, para 4-23), and reassemble filter bracket. Go to section V.

(2) If continuity is not good; replace faulty filter(s) (Section IV, para 4-23), apply 0.04-0.08 inch coating of red staking compound (SM-A-852314) on S6 and CB1 and T1, terminals 1 through 5. Go to section V.

i. Peel or pick away red staking compound covering T1 terminals (fig. 4-1 and FO-1). Set POWER to OFF. Connect power cable to power source, and set POWER to ON.

j. Set multimeter (F = ∿V, R = 200 V); measure voltage between T1-4 and T1-5.

(1) If meter reading is between 20 and 30 VAC; set POWER to OFF, apply 0.04-0.08 inch coat of red staking compound (SM-A-852314) over T1 terminals 1 through 5, and go to step *k*.

(2) If meter reading is not between 20 and 30 VAC; set POWER to OFF, replace T1 (Section IV, para 4-18). Go to section V.

k. Check continuity from XDS1-1 to T1-4 and from XDS1-2 to T1-5 (fig. 4-2 and FO-1) using multimeter.

(1) If no fault found; replace power indicator holder DS1 (Section IV, para 4-34). Go to section V.

(2) If a fault is found; resolder connection or replace faulty lead. Go to section V.

Test 3. TB1-R2 Test.

a. Set POWER to OFF; measure resistance between TB1-E7 and TB1-E8 (fig. 3-3) using multimeter setting (F = Ω, R = 200 KΩ).

(1) If resistance is equal to or less than 50,000 ohms; replace panel meter M1 (Section IV, para 4-24). Go to section V.

(2) If resistance is more than 50,000 ohms; replace TB1-R2 (Section IV, para 4-31). Go to section V.

Test 4. Internal Battery (B-1) Test.

a. Set multimeter (F = ⎓ V, R = 20 V). Connect negative lead to C1 (−) negative (fig. 3-3). Connect positive lead to S12-9 (fig. 4-2 and FO-1); check voltage reading.

(1) If voltage is more than 1 VDC; go to step *b*.

(2) If voltage is equal to or less than 1 VDC; go to step *f*.

b. Remove positive lead of multimeter from S12-9; connect it to S12-C2 (fig. 4-2 and 3-3). Check voltage reading.

(1) If voltage is more than 1 VDC; go to step *c*.

(2) If voltage is equal to or less than 1 VDC; go to step *j*.

c. Set POWER to OFF; check continuity between S12-C2 (fig. 4-2 and 3-3) and panel meter M1 positive (+) while VOLTAGE TEST switch is depressed.

(1) If continuity is good; go to step *d*.

(2) If continuity not good; check for faulty wiring between S12-C2 and S5-3 NO (fig. 4-2 and FO-1) or between S5-3C and M1 positive (+). If wiring not faulty; replace S5 (Section IV, para 4-33). Go to section V.

d. Check for continuity between panel meter M1 negative (−) and TB1-E13 (fig. 3-3) while VOLTAGE TEST switch is depressed.

(1) If continuity is good; replace M1 (Section IV, para 4-24). Go to section V.

(2) If continuity not good; go to step *e*.

e. Check continuity between S12-C1 and S12-3 (fig. 4-2).

(1) If continuity is good; check for faulty wiring between panel meter M1 negative (−) and S5-2 C, S5-2 NO and S12-C1, or between S12-3 and TB1-E13 (fig. 3-3). If wiring is not faulty: replace S5 (Section IV, para 4-33). Go to section V.

(2) If continuity not good; replace S12 (Section IV, para 4-30). Go to section V.

f. Remove positive (+) lead from S12-9; connect it to CB1-NO (fig. 4-2).

(1) If voltage is more than 1 VDC; set POWER to OFF, check for faulty wiring between S12-9 and S5-1 NO, or between S5-1 NO and CB1-NO. Repair faulty wiring. Go to section V.

(2) If the voltage is equal to or less than 1 VDC; go to step *g*.

g. Remove positive lead (+) from CB1-NO (fig 4-2) and connect it to CB1-C.

(1) If voltage is more than 1 VDC; replace CB1 (Section IV, para 4-19). Go to section V.

(2) If voltage is equal to or less than 1 VDC; g

to step *h*.

h. Set POWER to OFF; remove memory battery B1 (TM11-6130-392-12).

i. Measure voltage across battery B1, using multimeter.

(1) If voltage is more than 1 VDC; replace P2 battery connector (Section IV, para 4-36). Go to section V.

(2) If the voltage is equal to or less than 1 VDC; replace B1. Go to section V.

j. Set POWER to OFF; check continuity between S12-C2 and S12-6, and between S12-C3 and S12-9 (fig. 4-2) using multimeter.

(1) If continuity is good; check for faulty wiring between S12-6 and TB1-E8 (fig. 3-3) and between TB1-E7 and S12-C3. If wiring is not faulty; replace TB1-R2 (Section IV, para 4-31). Go to section V.

(2) If continuity is not good; replace S12 (Section IV, para 4-30). Go to section V.

Test 5. SET CHARGE TIME Switch (S3) Test

a. Set multimeter (F = ⎓ V, R = 200 V). Connect negative lead (−) to C1 negative (−) (fig. 3-3). With positive lead; measure voltages at test points (fig. 4-2): S3A pin 2, S3B pin 8 and S3C, pin 8.

(1) If the voltage is more than 9 VDC at each pin; go to step *b*.

(2) If the voltage is equal to or less than 9 VDC at any one pin; set POWER to OFF, replace S3 (Section IV, para 4-25).

b. With positive lead of multimeter, measure voltage at S3B pins 1, 2 and 4 and S3C pins 1, 2 and 4.

(1) If the voltage is less than 1 VDC at each pin; set POWER to OFF, check for faulty wiring between S3A-2 and A12-28 connector (fig. 3-2 and 3-6), S3B-1 and A12-26 connector, S3B-2 and A12-22 connector, S3B-4 and A12-13 connector, S3B-8 and A12-27 connector, S3C-1 and A12-2 connector, S3C-2 and A12-4 connector, S3C-4 and A12-3 connector, and S3C-8 and A12-1 connector. Repair faulty wiring. (If plug-in board connector must be replaced; send to depot). Go to section V.

(2) If the voltage is 1 VDC or more at any pin; set POWER to OFF, replace S3 (Section IV, para 4-25).

Test 6. Transformer (T1) Output Test.

a. Set POWER to OFF. Check continuity between T1-8 (fig. 4-1) and A11-22 (fig. 3-2 and 3-4) and between T1-9 and A11-23 with multimeter.

(1) If continuity is good; replace faulty T1 transformer (Section IV, para 4-18). Go to section V.

(2) If continuity is not good; check for the faulty wiring between A11-22 connector and T1-8, and between A11-23 and T1-9, or for a faulty connector. Repair open lead or replace wire (if plug-in board connector must be replaced; send to depot). Go to section V.

Test 7. TB1 and Transformer (T1) Test.

a. Check position of INPUT VOLTAGE switch, rear of battery charger:

(1) If INPUT VOLTAGE switch is in 115 VAC position; go to step *b*.

(2) If INPUT VOLTAGE switch is in 230 VAC position; set POWER to OFF. Set INPUT VOLTAGE switch to 115 VAC position. Go to section V.

b. Set multimeter (F = ⎓ V, R = 200 V). Connect negative (−) lead to C1 negative (−) terminal (fig. 3-3). Connect positive (+) lead to A11-TP7 (fig. 3-2 and 3-4).

(1) If voltage is more than 30 VDC; go to step *c*.

(2) If voltage is equal to or less than 30 VDC; go to step *g*.

c. Set POWER to OFF. Set multimeter (F = Ω, R = 200 KΩ). Measure resistance between TB1-E1 (fig. 3-3) and TB1-E2 with multimeter.

(1) If resistance is less than 17,500 ohms; go to step *d*.

(2) If resistance measured is equal to or more than 17,500 ohms; replace TB1-R1 (Section IV, para 4-31). Go to section V.

d. Set multimeter (F = Ω, R = 20 KΩ). Measure resistance between TB1-E5 and TB1-E6 (fig. 3-3).

(1) If resistance is less than 9,500 ohms; go to step *e*.

(2) If resistance measured is equal to or more than 9,500 ohms; replace TB1-R11 (Section IV, para 4-31). Go to section V.

e. Set multimeter (F = Ω, R = 20 KΩ). Measure resistance between TB1-E15 and TB1-E16 (fig. 3-3).

(1) If resistance is less than 5,000 ohms; go to step *f*.

(2) If resistance measured is equal to or more than 5,000 ohms; replace TB1-R12 (Section IV, para 4-31). Go to section V.

f. Perform panel meter (M1) adjustment (Section IV, para 4-36).

(1) If meter can be adjusted, go to section V.

(2) If meter cannot be adjusted; replace panel meter M1 (Section IV, para 4-24). Go to section V.

g. Set multimeter (F = ∼ V, R = 200 V). Set POWER to OFF.

h. Peel or pick away red staking compound on transformer T1 (fig. 4-1).

i. Set POWER to ON. Measure AC voltage across T1-1 and T1-2.

(1) If voltage is more than 100 VAC; go to step *j*.

(2) If voltage is equal to or less than 100 VAC; set POWER to OFF; replace S1 (Section IV, para 4-21). Apply a 0.04-0.08 inch coat of red staking compound (SM-A-852314) on T1-1 through T1-5

terminals. Go to section V.

j. Measure AC voltage across T1-6 and T1-7.

(1) If the voltage is more than 30 VAC; go to step *k*.

(2) If voltage is equal to or less than 30 VAC; set POWER to OFF, replace T1 (Section IV, para 4-18). Go to section V.

k. Set multimeter (F = ⎓ V, R = 200 V). Set POWER to OFF.

l. Peel or pick away red staking compound from C1 positive (+) terminal (fig. 3-3). Connect negative lead (−) of multimeter to C1 negative (−) and connect positive lead to C1 positive (+).

m. Set POWER to ON; check multimeter.

(1) If voltage is more than 30 VDC; set POWER to OFF, check for faulty wiring between A14-CR1-2 (fig. 4-2) and C1 positive (+) terminal (fig. 3-3) and between C1 (+) and A6-21 connector (fig. 3-7). Repair faulty wiring. Apply 0.04-0.08 inch coat of red staking compound (SM-A-852314) to T1-1 through T1-5 and C1 (+). Go to section V.

(2) If voltage is equal to or less than 30 VDC; replace A14-CR1 (fig. 4-2) resistor assembly component (Section IV, para 4-22). Apply 0.04-0.08 inch coat of red staking compound (SM-A-852314) to C1 (+) and to T1-1 through T1-5. Go to Section V.

Test 8. High Voltage Power Supply Test.

a. Set multimeter (F = ∼V, R = 200 V). Measure voltage across T1-6 and T1-7.

(1) If voltage is more than 10 VAC; go to step *b*.

(2) If voltage is equal to or less than 10 VAC; set POWER to OFF, replace T1 (Section IV, para 4-18). Go to section V.

b. Measure AC voltage across two AC terminals of A14-CR1 (fig. 4-2) resistor assembly component.

(1) If voltage is more than 10 VAC; go to step *c*.

(2) If voltage is equal to or less than 10 VAC; set POWER to OFF, check for faulty wiring between A14-CR1-3 (AC) and T1-6 (fig. 4-2) and between A14-CR1-1 (AC) and T1-7. Repair faulty wiring. Go to section V.

c. Set POWER to OFF. Peel or pick away red staking compound on A14-CR1-2 positive (+) terminal (fig. 4-2 and FO-1).

d. Set multimeter (F = ⎓ V, R = 200 V). Connect negative (−) lead to A14-CR1-4 negative (−) and connect positive (+) lead to A14-CR1-2 positive (+).

e. Set POWER to ON; check multimeter

(1) If voltage is equal to or less than 20 VDC; set POWER to OFF, replace A14-CR1 (Section IV, para 4-22). Go to section V.

(2) If voltage is more than 20 VDC; set POWER to OFF, check for faulty wiring between A14-CR1-2 (+) and C1 (+), C1 (+) and A6-21 connector, and C1 (+) and A14-R13-2 (fig. 4-2 and 3-3). Repair faulty wiring. Apply 0.04-0.08 inch coat of red staking compound (SM-A-852314) to A14-CR1-2 positive (+). Go to section V.

Test 9. VOLTAGE TEST SELECT Switch (S12) Short Circuit Test.

a. Set POWER to OFF.

b. Remove wire on S12-1 (fig. 4-2) that runs from TB1-E2 (fig. 3-3).

c. Set multimeter (F = Ω, R = 200Ω). Measure resistance between S12-1 and S12-3.

(1) If resistance is less than 2 ohms; replace S12 (Section IV, para 4-30). Go to section V.

(2) If resistance is equal to or more than 2 ohms; check to find low resistance to ground at either TB1-E2 (fig. 3-3) or S4A-C2 (fig. 4-2). Repair fault; reconnect wire on S12-1. Go to section V.

Test 10. Metering Circuit Test.

a. Set CHANNEL SELECT switch to position 1.

b. Check continuity from A6-4 connector (fig. 3-2 and 3-7) to TB1-E2 (fig. 3-3).

(1) If continuity is good; go to step *c*.

(2) If continuity is not good; go to step *e*.

c. Set multimeter (F = Ω, R = 200 KΩ). Measure resistance between TB1-E2 and TB1-E15 (fig. 3-3) with VOLTAGE TEST switch depressed.

(1) If resistance is less than 32,000 ohms; go to step *d*.

(2) If resistance measured is equal to or more than 32,000 ohms; go to step *f*.

d. Check continuity between VOLTAGE TEST switch S5-2 NC (fig. 4-2) and TB1-E22.

(1) If continuity is good; replace S5 (Section IV, para 4-33). Go to section V.

(2) If continuity is not good; repair faulty wire between S5-2 NC and TB1-E22. Go to section V.

e. Check continuity between TB1-E2 and S4A-C2 (fig. 4-2).

(1) If continuity is good; replace CHANNEL SELECT switch S4 (Section IV, para 4-29). Go to section V.

(2) If continuity is not good; repair faulty wire between TB1-E2 and S4A-C2. Go to section V.

f. Set multimeter (F = Ω, R = 200 KΩ). Measure resistance between TB1-E1 and TB1-E2 with VOLTAGE TEST switch depressed.

(1) If resistance is less than 17,500 ohms, go to step *g*.

(2) If resistance measured is 17,500 or more ohms; replace TB1-R1 (Section IV, para 4-31). Go to section V.

g. Set multimeter (F = Ω, R = 20 KΩ). Measure resistance between TB1-E5 and TB1-E6 (fig. 3-3).

(1) If resistance is less than 9,500 ohms; go to step *h*.

(2) If resistance measured is 9,500 or more ohms; replace TB1-R11 (Section IV, para 4-31). Go

to section V.

h. Depress VOLTAGE TEST switch; measure resistance between TB1-E15 and TB1-E16.

(1) If resistance is less than 5,000 ohms; check for faulty wiring between TB1-E6 and TB1-E16, repair fault. Go to section V.

(2) If resistance measured is 5,000 ohms or more; replace TB1-R12 (Section IV, para 4-31). Go to section V.

Test 11. Low Voltage Power Supply Test.

a. Get small flat-blade screwdriver, or equivalent; adjust A11-R3 (fig. 3-4) until all channels read between 45 mA and 50 mA.

(1) If this adjustment can be made; go to step *b*.

(2) If adjustment, within 45-50 mA, cannot be made; set POWER to OFF, replace A11 power supply assembly (Chapter 3, para 3-15 direct support maintenance). If same problem repeats; adjust panel meter M1 (Section IV, para 4-36). Go to section V.

b. Set all FINE ADJ controls fully clockwise.

c. Turn CHANNEL SELECT switch (fig. 4-1) through each of 5 positions; check panel meter reading.

(1) If each channel reads 200 mA, or more; go to section V.

(2) If one or more channels reads less than 200 mA; set POWER switch to OFF. Replace A11 power supply assembly (Chapter 3, para 3-15). If same problem repeats; adjust panel meter M1 (Section IV, para 4-36). Go to section V.

Test 12. Terminal Board (TB1) Test.

a. Set multimeter (F = Ω, R = 200 KΩ). Set POWER to OFF. Set all CURRENT SET switches to 50 mA position. Measure resistance of TB1-R10 (fig. 3-3).

(1) If resistance is between 18,500 and 18,900 ohms; go to step *b*.

(2) If resistance is not between 18,500 and 18,900 ohms, replace R-10 (Section IV, para 4-31). Go to section V.

b. Check for continuity between S4A-C1 (fig. 4-2) and TB1-E4 with multimeter.

(1) If no fault is found; go to step *c*.

(2) If a fault is found; repair broken connection or replace faulty lead (if any plug-in connector must be replaced; send to depot). Go to section V.

c. Check for continuity between TB1-E3 and TB1-E1 (fig.3-3).

(1) If no fault is found; replace CHANNEL SELECT switch S4 (Section IV, para 4-29). Go to section V.

(2) If a fault is found; repair broken connection or replace faulty lead (if any plug-in connector must be replaced; send to depot). Go to section V.

Test 13. Current Set (S7-S11) Switch Test.

a. Set POWER switch to OFF and check for continuity (fig. 4-2 and 3-3) at following points, using multimeter:

If Faulty Channel is:	*Check Between:*
1	S7-6 and TB1-E21
2	S8-6 and TB1-E21
3	S9-6 and TB1-E21
4	S10-6 and TB1-E21
5	S11-6 and TB1-E21

(1) If no fault is found; go to step *b*.

(2) If a fault is found; repair broken connection or replace faulty lead. Go to section V.

b. Check for continuity (fig. 4-2 and FO-1) at following points, using multimeter:

If Faulty Channel is:	*Check Between:*
1	S7-5 and S4A-1
2	S8-5 and S4A-2
3	S9-5 and S4A-3
4	S10-5 and S4A-4
5	S11-5 and S4A-5

(1) If no fault is found; replace CURRENT SET switch (Section IV, para 4-26) for the matching faulty channel(s). Go to section V.

(2) If a fault is found; repair broken connection or replace faulty lead. Go to section V.

Section IV. Maintenance of Battery Charger

4-13. Component Replacement and Repair

Chassis and panel mounted components listed in paragraph 4-3*b*. are authorized replacements at general support level of maintenance. Open circuits may be soldered and individual leads may be replaced, if necessary. Replacement of printed wiring/board connectors or wiring harness, and repair of printed wiring/board assemblies and A15 assembly components is specifically limited to depot level maintenance.

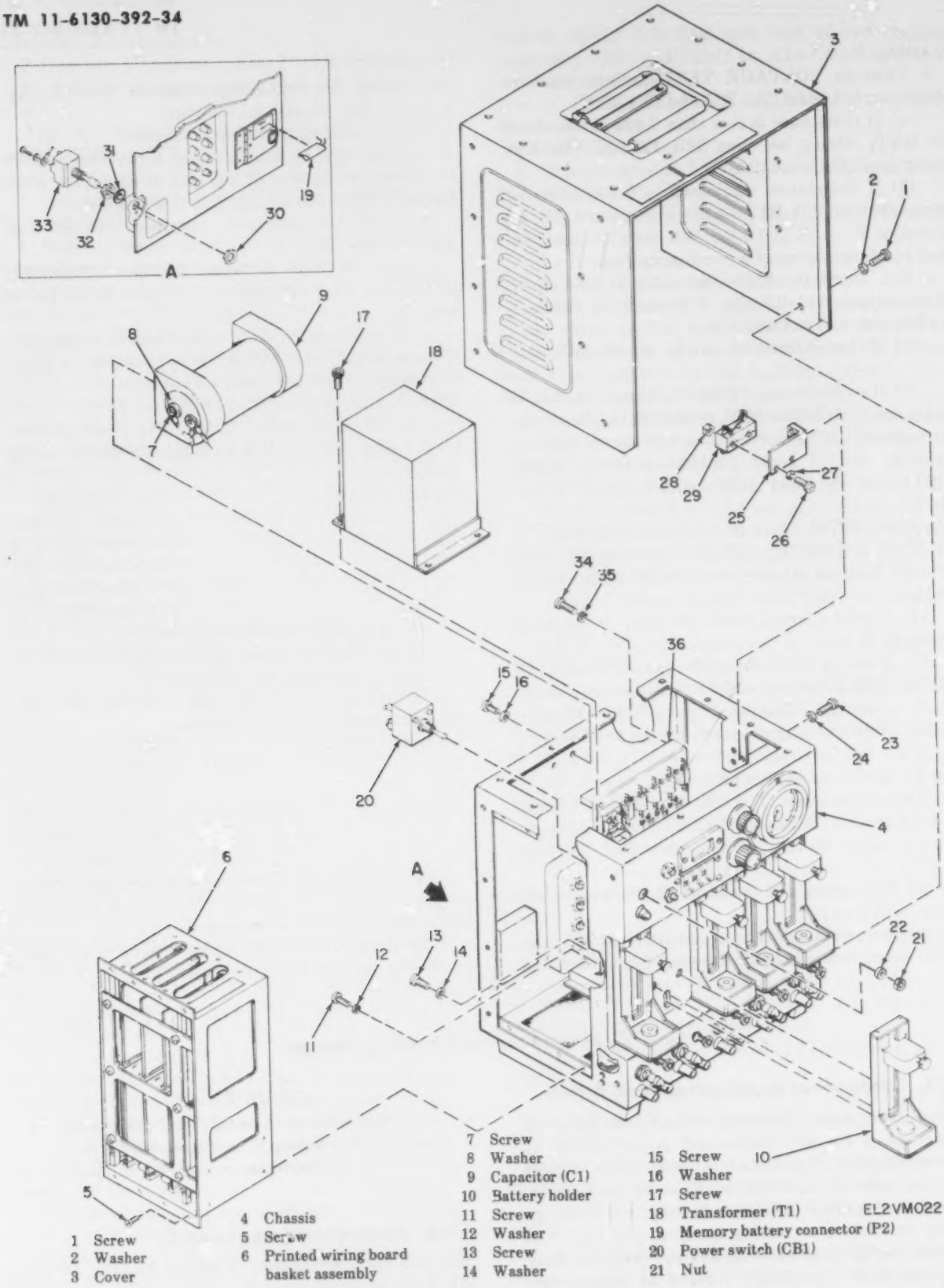
WARNING

Set POWER switch to OFF and disconnect power cable from power source before performing maintenance inside battery charger.

4-14. Battery Holders (1 and 2)

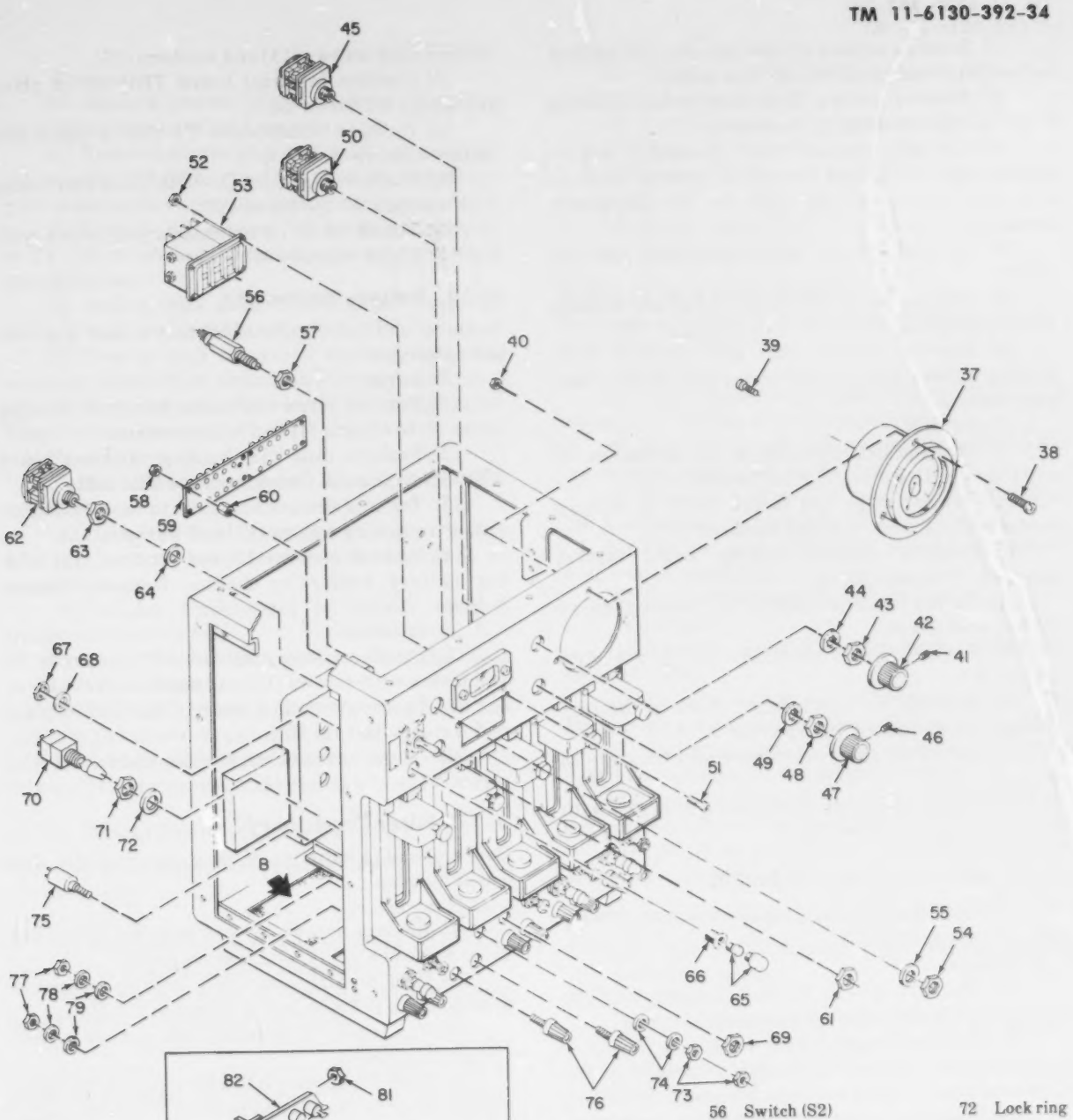
Removal and installation of either battery holder (fig. 4-3) are as follows:

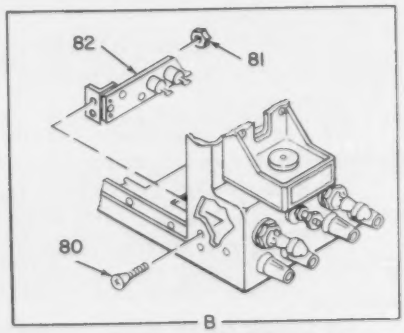
a. Removal.



1 Screw
2 Washer
3 Cover
4 Chassis
5 Screw
6 Printed wiring board basket assembly
7 Screw
8 Washer
9 Capacitor (C1)
10 Battery holder
11 Screw
12 Washer
13 Screw
14 Washer
15 Screw
16 Washer
17 Screw
18 Transformer (T1)
19 Memory battery connector (P2)
20 Power switch (CB1)
21 Nut

Figure 4-3. Repair of Battery Charger (Sheet 1 of 2)





22 Washer
23 Screw
24 Washer
25 Switch bracket
26 Screw
27 Washer
28 Nut
29 Interlock switch (S6)
30 Nut
31 Lock ring
32 Nut
33 Input voltage switch (S1)
34 Screw
35 Washer
36 Resistor board (A14)
37 Meter (M1)
38 Screw
39 Screw
40 Nut
41 Setscrew
42 Knob
43 Nut
44 Washer
45 Switch (S12)
46 Setscrew
47 Knob
48 Nut
49 Washer
50 Switch (S4)
51 Screw
52 Nut
53 Control (S3)
54 Nut
55 Washer
56 Switch (S2)
57 Nut
58 Nut
59 Terminal board (TB1)
60 Standoff
61 Nut
62 Switch (E5)
63 Nut
64 Lock ring
65 Lens/Lamp
66 Holder (DS1)
67 Nut
68 Washer
69 Nut
70 Switches (S7-S11)
71 Nut
72 Lock ring
73 Nut
74 Washer
75 Controls (R5-R9)
76 Jacks (J1-J10)
77 Nut
78 Washer
79 Washer
80 Screw
81 Nut
82 Filter assembly (A15)

EL2VM023

Figure 4-3. Repair of Battery Charger (Sheet 2 of 2)

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Tag and disconnect leads to battery holders (10) by removing screws (11) and washers (12).

(6) Remove screws (13) and washers (14), holding battery holders (10) to chassis. Remove battery holders.

b. Installation.

(1) Position battery holders (10) on chassis (4) and fasten with screws (13) and washers (14).

(2) Remove tags and fasten leads to battery holders with screws (11) and washers (12).

(3) Position printed wiring board basket assembly (6) in chassis (4).

(4) Fasten leads to capacitor C1 (9) with screws (7) and washers (8).

(5) Fasten basket assembly in chassis with screws (5).

(6) Perform an operational check of battery charger in accordance with section V.

(7) Install retainer on chassis and fasten with screws.

(8) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-15. Battery Holders (3 and 4)

Removal and installation of either battery holder (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (15) and washers (16) holding capacitor C1 (9) to chassis. Carefully move capacitor aside to gain access to bottom of chassis.

(3) Remove cap screws (17) holding transformer T1 (18) to chassis. Carefully move transformer out and aside.

(4) Remove nuts (58) holding terminal board TB1 (59) to chassis. Carefully move TB1 aside.

(5) Tag and disconnect leads to battery holders (10) by removing screws (11) and washers (12).

(6) Remove screws (13) and washers (14) holding battery holders to chassis. Remove battery holders.

b. Installation.

(1) Position battery holders (10) on chassis (4) and fasten with screws (13) and washers (14).

(2) Remove tags and fasten leads to battery holders with screws (11) and washers (12).

(3) Position terminal board TB1 (59) in place and fasten with nuts (58).

(4) Position transformer T1 (18) in place and fasten with cap screws (17).

(5) Position capacitor C1 (9) in place and fasten with washers (8) and screws (7).

(6) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-16. Battery Holder (5)

Removal and installation of battery holder (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove nuts (58) holding terminal board TB1 (59) to chassis. Carefully move TB1 aside.

(3) Tag and disconnect leads to battery holder (10) by removing screws (11) and washers (12).

(4) Remove screws (13) and washers (14) holding battery holder to chassis. Remove battery holder.

b. Installation.

(1) Position battery holder (10) on chassis (4) and fasten with screws (13) and washers (14).

(2) Position terminal board TB1 (59) in place and fasten with nuts (58).

(3) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-17. Filter Capacitor (C1)

Removal and installation of filter capacitor (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Peel or pick away red staking compound over positive (+) terminal of capacitor C1 (9).

(3) Tag leads to capacitor and remove screws (7) and washers (8).

(4) Remove screws (15) and washers (16) holding capacitor to chassis and remove capacitor.

b. Installation.

(1) Position capacitor C1 (9) on chassis (4) and fasten with screws (15) and washers (16).

(2) Remove tags and connect leads to capacitor and fasten with screws (7) and washers (8).

(3) Using red staking compound, apply a 0.04 to 0.08 inch coating over positive (+) terminal of capacitor.

(4) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-18. Transformer (T1)

Removal and installation of transformer (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (15) and washers (16) holding capacitor C1 (9) to chassis. Carefully move capacitor aside to gain access to bottom of chassis.

(3) Remove cap screws (17) holding transformer T1 (18) to chassis. Carefully move transformer out of chassis.

(4) Peel or pick away blue staking compound holding leads to side of transformer.

(5) Peel or pick away red staking compound covering transformer terminals 1 through 5.

(6) Tag and unsolder leads to transformer. Remove transformer.

b. Installation.

(1) Remove tags and solder leads to transformer T1 (18).

(2) Using red staking compound, apply a 0.04 to 0.08 inch coating over terminals 1 through 5 on transformer.

(3) Position transformer in chassis (4) and fasten with screws (17).

(4) Using blue staking compound, stake leads to side of transformer.

(5) Position capacitor C1 (9) in chassis (4) and fasten with screws (7) and washers (8).

(6) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-19. Power Switch (CB1)

Removal and installation of power switch (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Peel or pick away red staking compound covering leads on power switch CB1 (20).

(6) Tag and unsolder leads to power switch.

(7) Remove nut (21) and washer (22) holding power switch to chassis and remove switch.

b. Installation.

(1) Install power switch CB1 (20) in chassis (4) and fasten with nut (21) and washer (22).

(2) Remove tags and solder leads to power switch.

(3) Using red staking compound, apply 0.04 to 0.08 inch coating over leads on power switch.

(4) Position printed wiring board basket assembly (6) in chassis (4).

(5) Fasten leads to capacitor (C1) (9) with screws (7) and washers (8).

(6) Fasten basket assembly in chassis with screws (5).

(7) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-20. Interlock Switch (S6)

Removal and installation of interlock switch (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (23) and washers (24) holding switch bracket (25) to chassis.

(3) Remove screws (26), washers (27) and nuts (28) holding interlock switch S6 (29) to bracket.

(4) Peel or pick away red staking compound over switch terminals.

(5) Tag and disconnect leads to switch.

b. Installation.

(1) Remove tags and connect leads to interlock switch S6 (29).

(2) Position switch on switch bracket (25) and fasten with screws (26), washers (27) and nuts (28).

(3) Using red staking compound, apply a 0.04 to 0.08 inch coating over terminals of switch.

(4) Position bracket in chassis (4) and fasten with screws (23) and washers (24).

(5) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-21. Input Voltage Switch (S1)

Removal and installation of input voltage switch (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove nut (30) holding input voltage switch S1 (33) to chassis.

(3) Remove lock ring (31) and nut (32) from switch.

(4) Peel or pick away red staking compound over switch terminals.

(5) Tag and disconnect leads to switch.

b. Installation.

(1) Remove tags and connect leads to input voltage switch S1 (33).

(2) Using red staking compound, apply a 0.04 to 0.08 inch coating over terminal on switch.

(3) Install nut (32) and lock ring (31) on switch.

(4) Install switch in chassis and fasten with nut (30).

(5) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-22. Resistor Assembly (A14) and Components

Removal and installation of resistor assembly (fig. 4-2 and 4-3) and components on resistor assembly are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (34) and washers (35) holding resistor board A14 (36) to chassis. Carefully move resistor board away from chassis to gain access to rear of resistor board.

(3) Remove mounting hardware holding faulty component to resistor board.

(4) If CR1 is to be replaced, peel or pick away red staking compound over positive (+) terminal.

(5) Tag and disconnect leads to faulty component and remove component.

b. Installation.

(1) If CR1 is being replaced, proceed as follows:

(*a*) Install CR1 on resistor board. Fasten with mounting hardware removed in step *a*.(3).

(*b*) Remove tags and connect leads to CR1.

(*c*) Using red staking compound, apply a 0.04 to 0.08 inch coating over positive (+) terminal. Go to step (3).

(2) If any resistor (R11 through R15) is being replaced, proceed as follows:

(*a*) Install heat shrinkable insulation sleeving (M23053/5-105-2 per MIL-I-23053) over leads.

(*b*) Remove tags and solder leads to resistor and slide sleeving over connection.

(*c*) Using a heat gun, heat shrink sleeving on connection.

(*d*) Fasten resistor to resistor board with mounting hardware removed in step *a*(3). Go to step (3).

(3) Position resistor board (36) on chassis and fasten with screws (34) and washers (35).

(4) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-23. EMI Filters (FL1 and FL2)

Removal and installation of EMI filters (fig. 3-10) are as follows:

a. Removal

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) and washers (6) holding EMI bracket (7) to chassis.

(3) Remove nuts (8) from filters FL1 and FL2 (9).

(4) Carefully move filter bracket away from chassis to gain access to components inside.

(5) Tag and unsolder leads to filters and remove filters.

b. Installation.

(1) Install heat shrinkable insulation sleeving (M23053/5-105-2 per MIL-I-23053) over leads to replacement filters.

(2) Remove nuts from replacement filters and slide over leads.

(3) Route leads through filter mounting holes in bracket (7).

(4) Remove tags and solder leads to filters (9). Slide sleeving over connections.

(5) Using heat gun, heat shrink sleeving on connection.

(6) Position filters in mounting holes of bracket and fasten with nuts (8).

(7) Position bracket on chassis and fasten with screws (5) and nuts (6).

(8) Using red staking compound, apply a 0.04 to 0.08 inch coating over terminal of filters.

(9) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-24. Panel Meter (M1)

Removal and installation of panel meter (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (38) and nuts (40) holding panel meter (37) to panel and carefully remove meter to gain access to leads.

(3) Tag leads to meter and remove screws (39) holding leads on back of meter.

b. Installation.

(1) Remove tags and fasten leads to panel meter (37) with screws (39).

(2) Install meter in chassis (4) and fasten with screws (38) and nuts (40).

(3) Adjust meter as described in paragraph 4-36*b*.

4-25. Set Charge Time Control (S3)

Removal and installation of set charge time control (fig. 4-2 and 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Tag and unsolder leads to set time control (53).

(6) Remove screws (51) and nuts (52) holding control in chassis and remove control.

b. Installation.

(1) Install set charge time control (53) in chassis (4) and fasten with screws (51) and nuts (52).

(2) Remove tags and solder leads to set charge time control.

(3) Install printed wiring board basket assembly (6) in chassis.

(4) Connect leads to capacitor C1 (9) with screws (7) and washer (8).

(5) Fasten basket assembly to chassis with screws (5).

(6) Install cover (3) on chassis and fasten with screws (1) and washers (2).

4-26. Current Set Switches (S7-S11)

Removal and installation of current set switches (figs. 4-2 and 4-3) are as follows:

NOTE

For removal and installation of switches S7 and S8 go to steps *a.* and *b.*, switches S9, S10 and S11, go to steps *c.* and *d.*

a. Removal (S7 and S8).

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove screws (80) and nuts (81) holding filter assembly A15 (82) to chassis. Carefully move filter assembly aside.

(6) Remove nut (69) holding switch (70) in chassis.

(7) Carefully work switch back through chassis; tag and unsolder leads to switch.

(8) Remove lock ring (72) and nut (73) from switch.

b. Installation (S7 and S8).

(1) Install nut (71) and lock ring (72) on switch (70).

(2) Remove tags and solder leads to switch.

(3) Install switch in chassis (4) and fasten with nut (69).

(4) Install printed wiring board basket assembly (6) in chassis.

(5) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(6) Fasten basket assembly to chassis with screws (5).

(7) Install cover (3) on chassis and fasten with screws (1) and washers (2).

c. Removal (S9, S10 and S11).

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove screws (15) and washers (16) holding capacitor C1 to chassis. Carefully move capacitor aside to gain access to bottom of chassis.

(6) Remove cap screws (17) holding transformer T1 (18) to chassis. Carefully move transformer out of chassis.

(7) Remove screws (5, fig. 3-10) and nuts (6) holding EMI bracket (7) to chassis. Carefully move EMI bracket aside.

(8) Remove screws (80, fig. 4-3) and nuts (81) holding filter assembly A15 (82) to chassis. Carefully move filter assembly aside.

(9) Remove nut (69) holding switch (70) in chassis.

(10) Carefully work switch back through chassis; tag and unsolder leads to switch.

(11) Remove lock ring (72) and nut (71) from switch.

d. Installation (S9, S10 and S11).

(1) Install nut (71) and lock ring (72) on switch (70).

(2) Remove tags and solder leads to switch.

(3) Install switch in chassis (4) and fasten with nut (69).

(4) Position filter assembly A15 (82) in chassis and fasten with screws (80) and nuts (81).

(5) Position EMI bracket (7, fig. 3-10) in chassis and fasten with screws (5) and nuts (6).

(6) Install transformer T1 (18, fig. 4-3) in chassis and fasten with cap screws (17).

(7) Install capacitor C1 (9) in chassis and fasten with screws (15) and washers (16).

(8) Install printed wiring board basket assembly (6) in chassis.

(9) Correct leads to capacitor C1 (9) with screws (7) and washers (8).

(10) Fasten basket assembly to chassis with screws (5).

4-27. Fine Adjust Controls (R5-R9)

Removal and installation of fine adjust controls (figs. 4-2 and 4-3) are as follows:

NOTE

For removal and installation of controls R5 and R6 go to steps *a* and *b*, controls R7, R8 and R9 go to steps *c* and *d*.

a. Removal (R5 and R6).

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove nuts (73) and washers (74) holding fine adjust control (75) in chassis.

(6) Carefully work control back through chassis; tag and unsolder leads to control.

b. Installation (R5 and R6).

(1) Remove tags and solder leads to fine adjust control (75).

(2) Install control in chassis (4) and fasten with washers (74) and nuts (73).

(3) Install printed wiring board basket assembly (6) in chassis.

(4) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(5) Fasten basket assembly to chassis with screws (5).

(6) Install cover (3) on chassis and fasten with washers (2) and screws (1).

c. Removal (R7, R8 and R9).

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove screws (15) and washers (16) holding capacitor C1 to chassis. Carefully move capacitor aside to gain access to bottom of chassis.

(6) Remove cap screws (17) holding transformer T1 (18) to chassis. Carefully move transformer out of chassis.

(7) Remove screws (5, fig. 3-10) and nuts (6) holding EMI bracket (7) to chassis. Carefully move EMI bracket aside.

(8) Remove nuts (73, fig. 4-3) and washers (74) holding fine adjust control (75) in chassis.

(9) Carefully work control back through chassis; tag and unsolder leads to control.

d. Installation (R7, R8 and R9).

(1) Remove tags and solder leads to fine adjust control (75).

(2) Install control in chassis (4) and fasten with washers (74) and nuts (73).

(3) Position EMI bracket (7, fig. 3-10) in chassis and fasten with screws (5) and nuts (6).

(4) Install transformer T1 (18, fig. 4-3) in chassis and fasten with cap screws (17).

(5) Install capacitor C1 (9) in chassis and fasten with screws (15) and washers (16).

(6) Install printed wiring board basket assembly (6) in chassis.

(7) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(8) Fasten basket assembly to chassis with screws (5).

(9) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-28. Remote Battery Jacks (J1-J10)

Removal and installation of remote battery jacks (fig. 4-2 and 4-3) are as follows:

NOTE

For removal and installation of jacks J1, J2, J6 and J7 go to steps *a* and *b*, jacks J3, J4, J5, J8, J9 and J10 go to steps *c* and *d*.

a. Removal (J1, J2, J6 and J7).

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove screws (80) and nuts (81) holding filter assembly A15 (82) to chassis. Carefully move filter assembly aside.

(6) Unsolder lead to jack.

(7) Remove nut (77) and washers (78 and 79) holding jack to chassis and remove jack.

b. Installation (J1, J2, J6 and J7).

(1) Install jack in chassis (4) and fasten with nut (77) and washers (78 and 79).

(2) Solder lead to jack.

(3) Install filter assembly (82) and fasten with screws (80) and nuts (81).

(4) Install printed wiring board basket assembly (6) in chassis.

(5) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(6) Fasten basket assembly to chassis with screws (5).

(7) Install cover (3) on chassis and fasten with washers (2) and screws (1).

c. Removal (J3, J4, J5, J8, J9 and J10).

(1) Remove screws (1) and washers (2) holding cover (3) to chassis (4).

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove screws (15) and washers (16) holding capacitor C1 to chassis. Carefully move capacitor aside to gain access to bottom of chassis.

(6) Remove cap screws (17) holding transformer T1 (18) to chassis. Carefully move transformer out of chassis.

(7) Remove screws (5, fig. 3-10) and nuts (6) holding EMI bracket (7) to chassis. Carefully move EMI bracket aside.

(8) Unsolder lead to jack.

(9) Remove nut (77) and washers (78 and 79) holding jack to chassis. Remove jack.

d. Installation (J3, J4, J5, J8, J9 and J10).

(1) Install jack in chassis (4) and fasten with nut (77) and washers (78 and 79).

(2) Solder lead to jack.

(3) Position filter assembly A15 (82) in chassis and fasten with screws (80) and nuts (81).

(4) Position EMI bracket (7, fig. 3-10) in chassis and fasten with screws (5) and nuts (6).

(5) Install transformer T1 (18, fig. 4-3) in chassis and fasten with cap screws (17).

(6) Install capacitor C1 (9) in chassis and fasten with screws (15) and washers (16).

(7) Install printed wiring board basket assembly (6) in chassis.

(8) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(9) Fasten basket assembly to chassis with screws (5).

(10) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-29. Channel Select Switch (S4)

Removal and installation of channel select switch (figs. 4-2 and 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) on chassis (4).

(2) Loosen set screws (40), holding knob (47) on switch S4 (50), and pull knob from switch.

(3) Remove nut (48) and washer (49) and work switch back through chassis.

(4) Tag and unsolder leads to switch.

b. Installation.

(1) Remove tags and solder leads to switch S4 (50).

(2) Install switch in chassis (4) and fasten with washer (49) and nut (48).

(3) Install knob (47) on switch and tighten set screws (46).

(4) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-30. Voltage Test Select Switch (S12)

Removal and installation of voltage test select switch (figs. 4-2 and 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) on chassis (4).

(2) Loosen set screws (41), holding knob (42) on switch S12 (45), and pull knob from switch.

(3) Remove nut (43) and washer (44) and work switch back through chassis.

(4) Tag and unsolder leads to switch.

b. Installation.

(1) Remove tags and solder leads to switch S12 (45).

(2) Install switch in chassis (4) and fasten with washer (44) and nut (43).

(3) Install knob (42) on switch and tighten set screws (41).

(4) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-31. Terminal Board (TB1)

Removal and installation of terminal board (figs. 4-2 and 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) on chassis (4).

(2) Tag and unsolder leads to terminal board TB1 (59).

(3) Using a wrench, hold standoff (60) and remove nut (58). Remove terminal board.

b. Installation.

(1) Install terminal board TB1 (59) on screws in chassis (4).

(2) Install nuts (58) on screws and tighten nuts.

(3) Remove tags and solder leads to terminals on terminal board.

(4) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-32. Start Time Switch (S2)

Removal and installation of start time switch (figs. 4-2 and 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) on chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove wire bundle tie wraps, as required, containing leads from switch S2 (56) to terminal board TB1 (59).

(6) Tag and unsolder leads from switch at terminals of terminal board TB1.

(7) Remove nut (54), washer (55) and remove switch from chassis. Remove nut (57) from switch.

b. Installation.

(1) Install nut (57) on switch S2 (56).

(2) Install switch in chassis (4) and fasten with washer (55) and nut (54).

(3) Solder leads of switch to terminals of terminal board TB1 (59) using tagged leads of removed switch as a guide.

(4) Route leads of switch in wiring bundle and fasten with tie wraps, as required.

(5) Install printed wiring board basket assembly (6) in chassis.

(6) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(7) Fasten basket assembly to chassis with screws (5).

(8) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-33. Voltage Test Switch (S5)

Removal and installation of voltage test switch (figs. 4-2 and 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) on chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove nut (61) holding switch S5 (62) in chassis. Remove switch from chassis and remove lock ring (64) and nut (63) from switch.

(6) Tag and unsolder leads to switch.

b. Installation.

(1) Install nut (63) and lock ring (64) on switch S5 (62).

(2) Remove tags and solder leads to switch.

(3) Install switch in chassis (4) and fasten with nut (61).

(4) Install printed wiring board basket assembly (6) in chassis.

(5) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(6) Fasten basket assembly to chassis with screws (5).

(7) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-34. Power Indicator Holder (DS1)

Removal and installation of power indicator holder (figs. 4-2 and 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) on chassis (4) and remove cover.

(2) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(3) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(4) Carefully move basket assembly out and aside.

(5) Remove lens with lamp (65) from holder DS1 (66).

(6) Tag and unsolder leads to holder. Remove insulating sleeving.

(7) Remove nut (67) and washer (68) holding holder in chassis. Remove holder.

b. Installation.

(1) Install holder DS1 (66) in chassis and fasten with washer (68) and nut (67).

(2) Install insulating sleeving on leads. Solder leads to holder and remove tags. Slide insulating sleeving over soldered connections, heat shrink insulation.

(3) Install lens with lamp (65) in holder.

(4) Install printed wiring board basket assembly (6) in chassis.

(5) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(6) Fasten basket assembly to chassis with screws (5).

(7) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-35. Memory Battery Connector (P2)

Removal and installation of battery connector (fig. 4-3) are as follows:

a. Removal.

(1) Remove screws (1) and washers (2) holding cover (3) on chassis (4) and remove cover.

(2) Open access door and disconnect memory battery connector P2 (19) from memory battery.

(3) Remove screws (5) holding printed wiring board basket assembly (6) in chassis.

(4) Carefully remove basket assembly to gain access to screw (7) and washer (8) holding leads to negative terminal on capacitor C1 (9); disconnect leads.

(5) Carefully move basket assembly out and aside.

(6) Remove wire bundle tie wraps, as required, containing leads from connector P2 to terminal board TB1 (59) and power switch CB1 (20).

(7) Peel or pick away red staking compound from terminaal on power switch.

(8) Tag and unsolder leads. Remove connector.

b. Installation.

(1) Route leads of connector P2 (19) through side of battery compartment to terminal board TB1 (59) and power switch CB1 (20).

(2) Fasten leads to wire bundles with tie wraps, as required.

(3) Solder leads to terminal on terminal board and to terminal on power switch using tagged lead of removed connector as a guide.

(4) Using red staking compound, apply a 0.04 to 0.08 inch coating over terminal on power switch.

(5) Install printed wiring board basket assembly (6) in chassis.

(6) Connect leads to capacitor C1 (9) with screws (7) and washers (8).

(7) Fasten basket assembly to chassis with screws (5).

(8) Install cover (3) on chassis and fasten with washers (2) and screws (1).

4-36. Meter (M1) Adjustment

WARNING

High voltage is present when interlock switch (S6) is overridden.

a. Using a heavy rubberband, fasten interlock switch S6 (29, fig. 4-3) in closed position.

b. Set INPUT VOLTAGE switch to 115V.

c. Connect power cable to a 115 VAC source.

d. Set BATTERY SELECT switch to 3.

e. Set all CURRENT SET switches to the 200 mA position.

f. Connect positive lead of digital multimeter (HP3465B or equiv.) to red REMOTE BATTERY terminal of channel 3 and negative lead to black terminal of channel 3.

g. Set to a scale that will conveniently read 50 mA.

h. Set POWER switch to ON.

i. Set SET CHARGE TIME control to 01.0; press START TIME switch.

j. Using a small bladed screwdriver, adjust CURRENT SET FINE ADJ control for channel 3 so that multimeter reads 100 ±0.10 mA.

k. Adjust TB1-R12 (fig. 4-2) so that panel meter (M1) reads 100 mA.

l. Set POWER switch to OFF.

m. Remove rubberband from interlock switch (S6).

n. Disconnect power cable from 115 VAC power source.

o. Install cover (3) on chassis and fasten with screws (1) and washers (2).

Section V. GENERAL SUPPORT TESTING PROCEDURE

4-37. General

Final testing of the Battery Charger PP-7286/U will be performed by general support maintenance personnel. Test procedure contained in this section will determine whether the performance of equipment, with components tested, replaced, or repaired, is satisfactory for return to users.

4-38. Performance Testing Procedure

a. Make sure that battery charger maintenance has been completed, and equipment is ready for final performance testing.

b. Make sure all controls are set accurately, when performing final test procedures. If in doubt about the result obtained in any test step; repeat the test step.

c. Perform the test procedures in the sequence listed in table 4-4. To be acceptable, battery charger must pass each test before being returned to users.

CAUTION

If meter needle pegs during any step of following table, quickly set POWER switch to OFF and perform troubleshooting test procedure of table 3-3.

Table 4-4. Performance Test Procedures

Column 1 Test Procedure	Column 2 Acceptable TEST RESULT	Column 3 Reference, or Instruction
(1) With power cable connected and battery charger prepared for testing per paragraph 3-10, set POWER switch to ON.	POWER ON lamp lights.	

Table 4-4. Performance Test Procedures—Continued

Column 1 Test Procedure	Column 2 Acceptable TEST RESULT	Column 3 Reference, or Instruction
(2) Set CHANNEL SELECT switch to 1. Set VOLTAGE TEST SELECT switch to B1. Check panel meter.	No current flow.	
(3) Press VOLTAGE TEST switch. Check Panel Meter.	Panel meter reads more than 700 mA.	
(4) Turn SET CHARGE TIME thumbwheels to 18.8. Press START TIME switch. Check CHARGE TIME HOURS REMAINING.	Display is 18.8.	
(5) Set CHANNEL SELECT switch to 1, all CURRENT SET switches to 50 mA and all FINE ADJ controls fully counterclockwise. Rotate CHANNEL SELECT switch to each of 5 positions in turn. Check current reading.	Reading is less than 15 mA (on 50 mA scale), each of 5 channels.	
(6) Set CHANNEL SELECT switch to 1. Adjust channel 1 FINE ADJ control for panel meter reading of 50 mA. Repeat for channels 2,3,4 and 5.	All channels can be adjusted for 50 mA meter reading.	
(7) Repeat steps (5) and (6) with CURRENT SET switches in 200 mA position.	*a.* Reading is less than or equal to 50 mA (on 200 mA scale), each of 5 channels. *b.* All channels can be adjusted to 200 mA meter reading.	
(8) Repeat steps (5) and (6) with CURRENT SET switches in 700 mA position.	*a.* Reading is less than or equal to 200 mA (on 700 mA scale), each of 5 channels. *b.* All channels can be adjusted to 700 mA meter reading.	
(9) Set all CURRENT SET switches to 50 mA and get stopwatch. Press START TIME switch. Record exact time taken by CHARGE TIME HOURS REMAINING display to change from 18.8 to 18.7 (Do not wait more than 7 minutes for change.) Limits are: Low—5 minutes, 42 seconds High—6 minutes, 18 seconds	Display changed from 18.8 to 18.7 within limits.	
(10) Set CHARGE TIME HOURS REMAINING to read 00.0. Press START TIME switch. Check display.	Display reads .0 when START TIME switch is pressed; goes blank when START TIME is released.	
(11) Check panel meter.	No current flow.	
(12) Set CHARGE TIME HOURS REMAINING to read 09.9. Press START TIME switch. Check display.	Display is 9.9.	
(13) Set CHARGE TIME HOURS REMAINING to read 00.9. Press START TIME switch. Check display.	Display is .9.	
(14) Repeat, as in (13), with settings at: 17.7 16.6 15.5 14.4 13.3 12.2 11.1 10.0 For each; check display.	Display is same for each of the 8 different settings.	
(15) Set CHARGE TIME HOURS REMAINING to read 18.8. Press START TIME switch. Remove power cable from 115 VAC input source. Use stopwatch; time 10 seconds, and reconnect power cable. Check display.	Display did not change; reads 18.8.	

Table 4-4. Performance Test Procedures—Continued

Column 1 Test Procedure	Column 2 Acceptable TEST RESULT	Column 3 Reference, or Instruction
(16) If performance tests are now completed, turn POWER switch to OFF. Remove power cable from 115 VAC source. Remove band from interlock switch and remove clip leads from REMOTE BATTERY jacks. Assemble retainer and cover set controls per para 3-10e. Refer to figure 3-1.	All tests were passed.	Go to step (17)
(17) Connect power cable to 115 VAC. Set POWER switch to ON.	POWER ON lamp lights.	
(18) Set POWER OFF, disconnect power cable, return battery charger to service.		

APPENDIX A
REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-6130-392-12	Operator's and Organizational Maintenance Manual for Charger, Battery PP-7286/U (6130-01-041-3490).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 38-750-1	The Army Maintenance Management System (TAMMS), Field Command Procedures.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official

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- Ft Carson (5)
- Army Dep (1) except
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  - SAAD (30)
  - TOAD (14)
  - SHAD (3)
- Ft Gillem (10)
- USA Dep)1)
- Sig Sec USA Dep (1)
- Ft Richardson (CERCOM Ofc) (2)
- Units org under fol TOE:
  - 29-207 (2)
  - 29-610 (2)

NG: None

USAR: None

For explanation of abbreviations used, see AR 310-50.

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TM 11-5840-340-12	23 Jan 74	Radar Set AN/[illegible]-76

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PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of [illegible] knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		FO3		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. + 24 VDC is the input voltage.

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SSG I. M. DeSpiritof 999-1776	SSG I. M. DeSpiritof

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